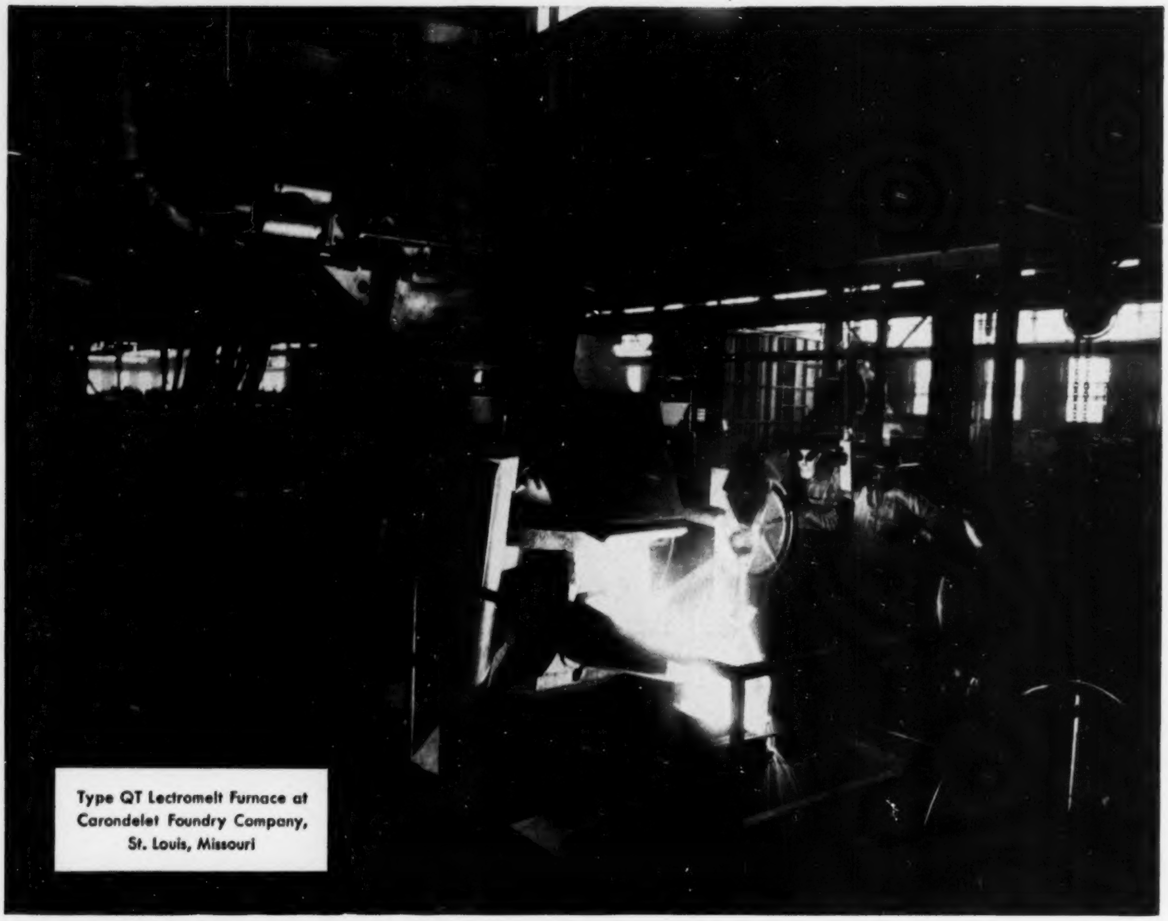
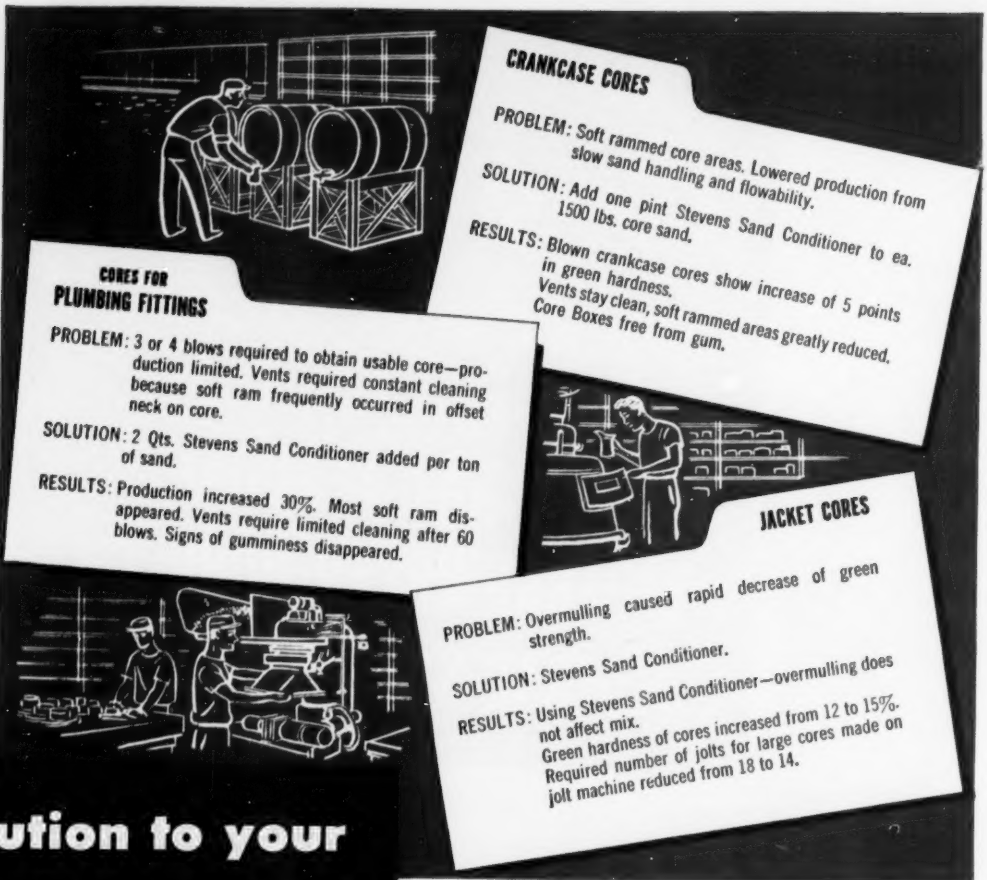
American Foundryman

THE FOUNDRYMEN'S OWN MAGAZINE

August 1953



Type QT Lectromelt Furnace at Carondelet Foundry Company, St. Louis, Missouri



A solution to your CORE PRODUCTION PROBLEMS . . .

STEVENS SAND CONDITIONER

The cases above, taken from our records, show what Stevens Sand Conditioner has done to assure better castings for a few of the many satisfied Stevens customers. Here's how Stevens Sand Conditioner helps core problems:

1. Increases flowability and ramability of core sand containing cereal flour and core oil, or phenolic resins.
2. Cores are more easily released from all types of core boxes.
3. Keeps sand from sticking in hoppers, conveyors, mullers and all types of sand handling equipment.
4. Reduces dusting and loss from a muller of fines from cereal flour, resins, wood flour and clay.
5. Prevents the loss of green strength on overmulling the sand.

Get facts about this non-toxic, low-cost Sand Conditioner today. Call your Stevens Sales Representative, or write direct for Stevens Technical Bulletin F 101. FREDERIC B. STEVENS, INC. Detroit 16, Mich.

STEVENS

EVERYTHING FOR A FOUNDRY

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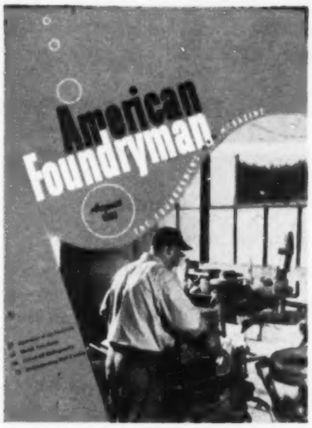
American Foundryman

Volume 24 **August 1953** *Number 2*

Published by American Foundrymen's Society



Molding precision castings in green sand at the La Crosse (Wis.) Works of Allis-Chalmers Mfg. Co. Full story will appear in the September issue of AMERICAN FOUNDRYMAN.

In This Issue . . . .

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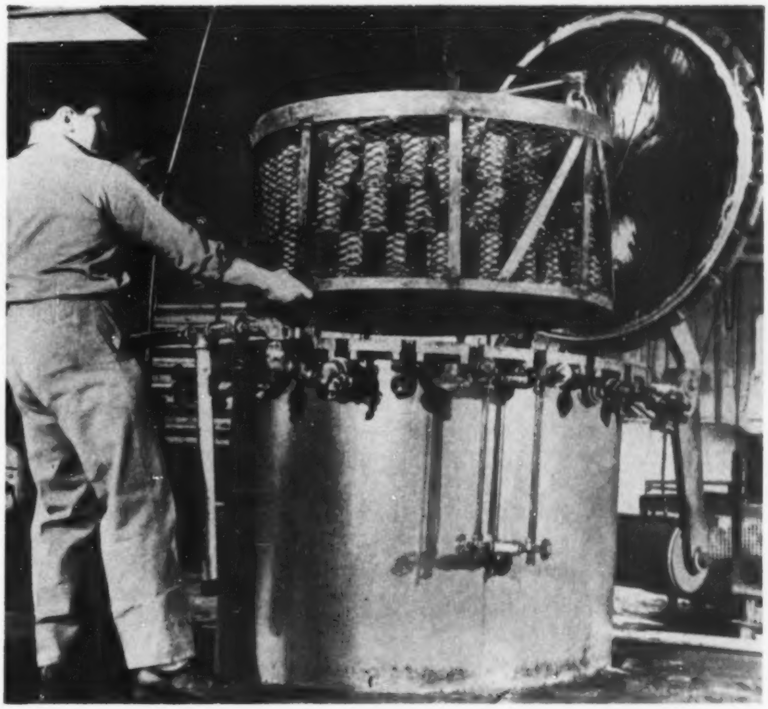
Here's How...

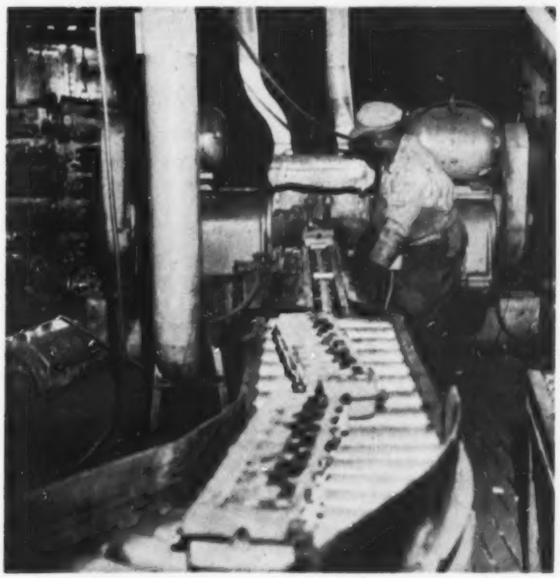
• • • Moran Towing & Transportation Co., Inc., solved problems in handling highly corrosive 13% sulfuric acid-17% ferrous sulfate solution. Former pump life was about 4 months. After impregnating ferrous and non-ferrous pump and valve parts, using the process of American Metaseal Mfg. Corp., New York, equipment life has thus far been multiplied seven-fold. Pump casings, gate valves, and other equipment impregnated in August, 1951, is claimed to have shown no signs of deterioration or failure to date.

For more data, circle No. 1 on card, page 17



• • • the brass foundry of Waterbury Mfg. Co., Waterbury, Conn., now handles flasks mechanically with a conveyor system engineered by the Gifford-Wood Co., Hudson, N. Y. Virtually all manual handling is eliminated. Empty flasks are stacked at molding station for next mold.

For more data, circle No. 2 on card, page 17



• • • one of the leading auto manufacturers has achieved man-hour savings in the processing of rough cylinder head castings by installing Besly 630-30 grinders. Heads are fed automatically through the grinder and fins are snagged off at a single pass, producing clean, smooth castings.

For more data, circle No. 3 on card, page 17

For rapid cleaning of Meehanite® castings, Fulton foundry uses CLECO Chippers

Fulton Foundry & Machine Company of Cleveland, Ohio, makes big Meehanite® castings for builders of heavy machinery. Cleaning these castings is a big job that can be most expensive unless the right tools are used.

That is why Fulton has selected Cleco Chippers. Workers like the fast action and easy handling. Management likes the high production and low maintenance costs.

Cleco Chippers save time and money cleaning all types of castings from cast iron to stainless steel — from magnesium to bronze. Ask for a demonstration in your plant — right away.

CLECO AIR TOOLS

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Products & Processes

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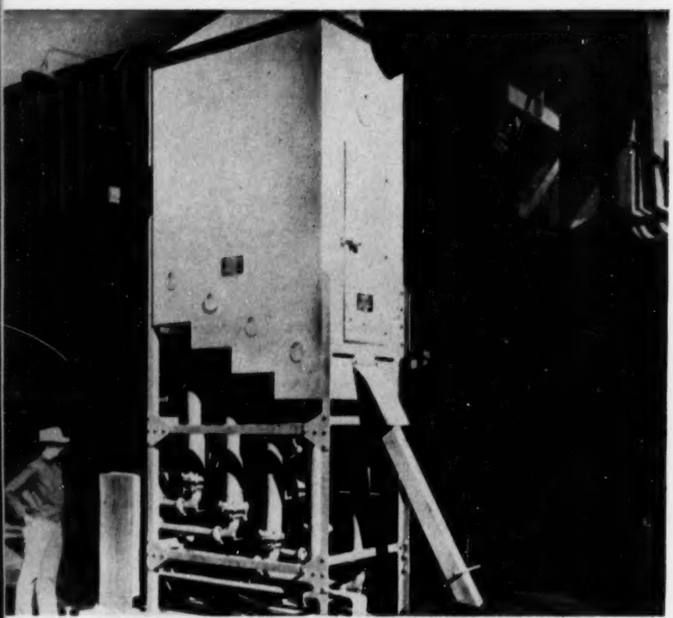
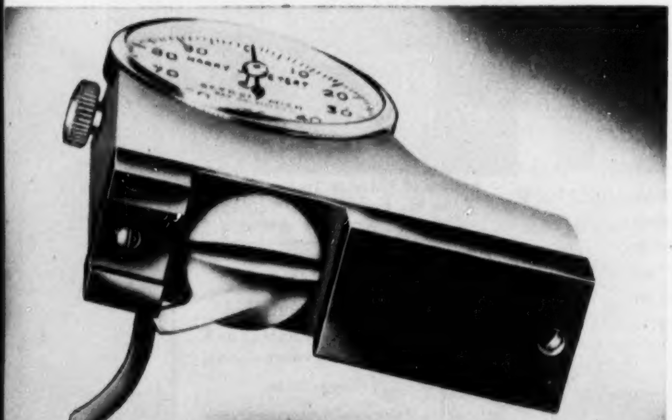
(continued on page 10)



Sand Scrubber Unit

This sand recovery system operates pneumatically and requires no oil or water medium for scrubbing operation. Simple and easy to operate. *National Engineering Co.*

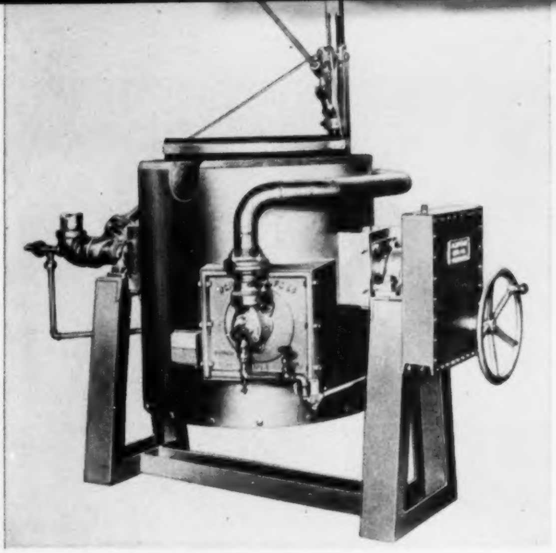
For more data, circle No. 4 on card, page 17



Dry Hardness Tester

Here is a practical pocket tool designed to measure surface or sub-surface hardness of baked cores and dried molds. Provides reliable data for specification and control purposes. Free literature available. *Harry W. Dietert Co.*

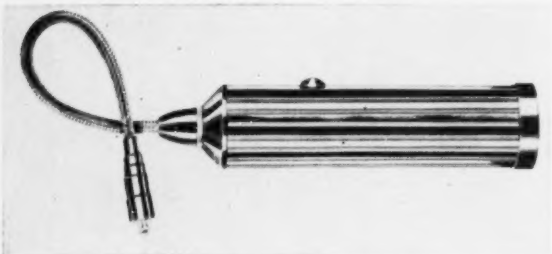
For more data, circle No. 5 on card, page 17



Improved Brass Furnace

A new, improved brass melting furnace designed for high capacity, rapid melting of all non-ferrous metals, is announced. Either oil or gas fired, the furnace is said to be extremely fast, has long-life linings. *Johnston Mfg.*

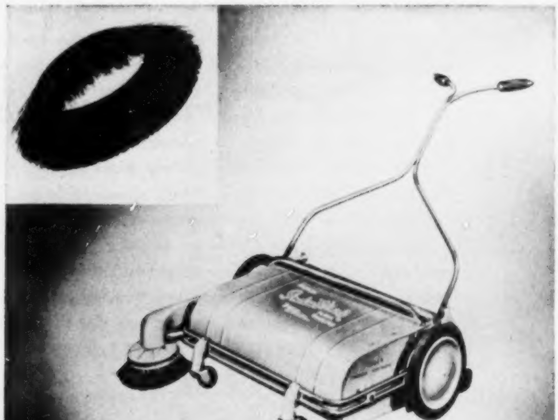
For more data, circle No. 6 on card, page 17



Battery Inspection Light

Made in two models, this battery-operated inspection light will go through holes as small as ½-in. diameter. All-metal barrels, flexible woven metallic extension. *Ericson Mfg Co.*

For more data, circle No. 7 on card, page 17



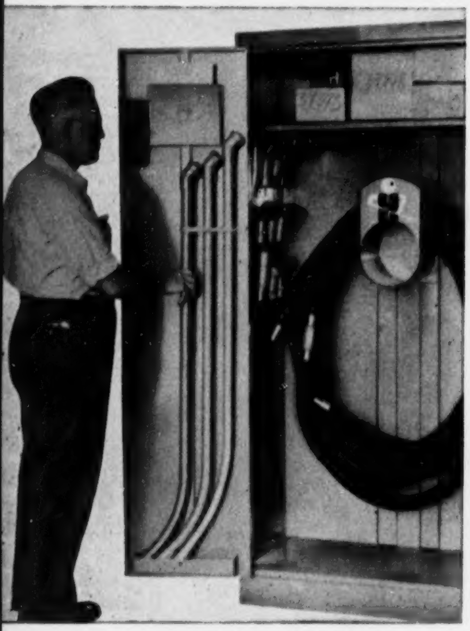
Nylon Industrial Brushes

This line of industrial floor sweepers is equipped with black all-nylon brushes as refills for side-sweeping wall brush attachments. Nylon bristles are reported to show amazingly long life in use. *Parker Sweeper Co.*

For more data, circle No. 8 on card, page 17

Products & Processes

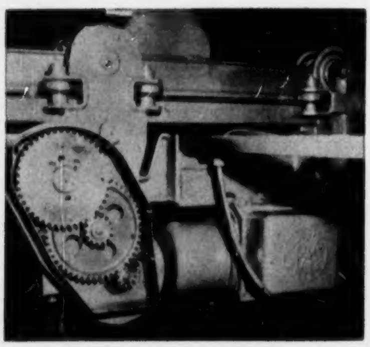
For additional information,
use postcard at bottom of page 17



Hose, Tool Cabinet

Completely equipped for utility and convenience, this hose and tool cabinet protects from damage and loss. *U. S. Hoffman Mach. Corp.*

For more data, circle No. 9, p. 17



Motor-Driven Trolley

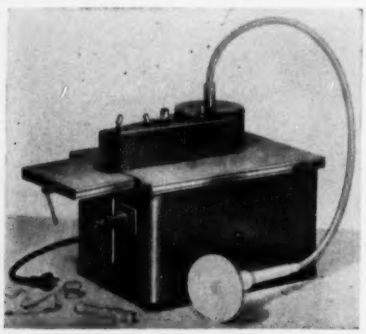
Any of 18 travel speeds can be furnished for this motor driven trolley for tramrail service. Available in 4-or 8-wheel design. Longer wheel bases available if needed. *Forker Corp.*

For more data, circle No. 10, p. 17

Long-Life Saw Blade

Manufacturer claims 50% more cutting life for this new Target blade. Cutting segments have been increased a full 50% to make this added life possible. *Robt. G. Evans Co.*

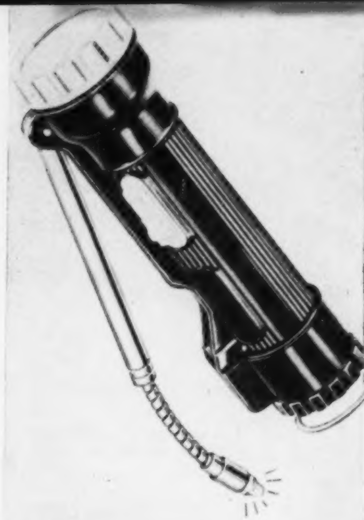
For more data, circle No. 11, p. 17

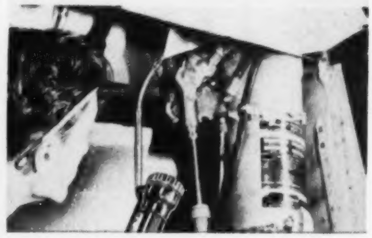


New Type Belt Sander

A Multi-Shaper Radius Sander is designed to handle a wide variety of work. It is a belt sander using only one rotating drum, radius changeable tips. *Von Jonker Corp.*

For more data, circle No. 12, p. 17

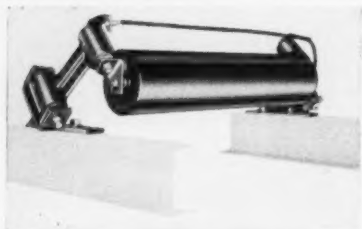




Flexible Probe Light

Usalite Duo-Flex is a new industrial flashlight for pinpoint inspection. *U. S. Electric Mfg. Corp.*

For more data, circle No. 13, p. 17



Belt Training Return Idler

This new idler provides automatic alignment for return belt. *Chain Belt of Milwaukee.*

For more data, circle No. 14, p. 17

New Hopper Base

Self-dumping hopper with special base cuts time, labor costs. *Roura Iron Works, Inc.*

For more data, circle No. 15, p. 17

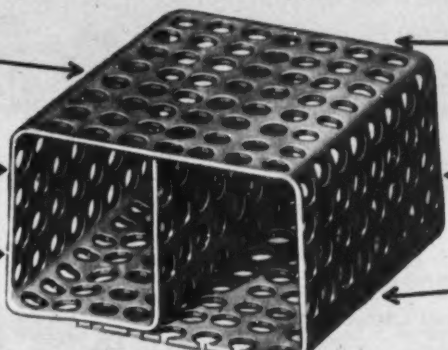
the perfect COMBINATION of SHAPE and SIZE for LIGHT CORE castings

fine FANNER perforated chaplets

PERFORATIONS
Large number of perforations in light metal insure perfect fusion in light castings.

LARGE SUPPORT AREA
Widely distributed support area holds core more securely in place.

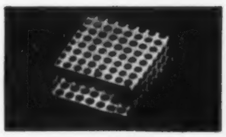
FLEXIBLE SHAPE
Made in 10 styles in any shape or contour required, flat, or curved to any radius, wedge-shape, bridged or with extended ends.



WILL NOT CHILL
Because of the large perforated area, there is no concentration of metal at any point to chill and cause leaks.

ACCURATELY MADE
Produced to exacting standards on specially designed machines to meet specifications.

PERFECT VENT
There are no gas or air pockets to cause "blow holes", so that perfect ventilation is secured.



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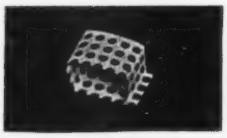

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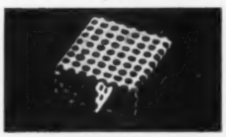

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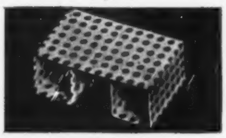

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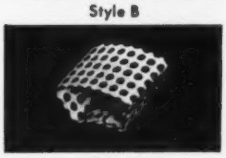
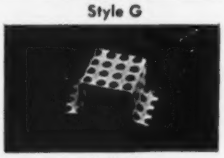


Style C



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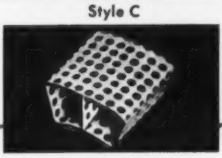

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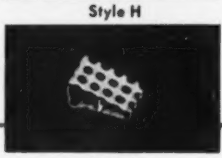
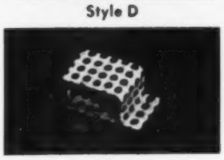


Style I



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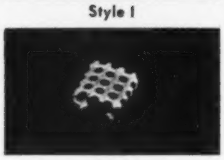

Style J

Here is the most versatile of chaplets for light core work. Gives you the exact features you want to fit your particular need—the right shape, the right size, the right construction, the right material. Fine Fanner Perforated Chaplets are ideally suited to a wide variety of applications where there is no need for heavy core support. Made of tin coated sheet steel for ferrous castings—of aluminum, copper or brass for use in castings of these metals. The perforated design offers a great number of advantages; more perfect fusion in light sections, perfect ventilation eliminates pockets that cause "blow holes", there is no concentration of metal at any point to chill and result in leaks. Wide support area holds core securely. Shape can be designed to fit almost any contour. They are available in a large number of types, some of which are illustrated, and an extremely wide range of thicknesses and sizes. Get acquainted with fine Fanner Perforated Chaplets by sending for a free copy of the Fanner Chaplet Catalog today.

THE FANNER MANUFACTURING CO.

Designers and Manufacturers of Fine Fanner Chaplets and Chills

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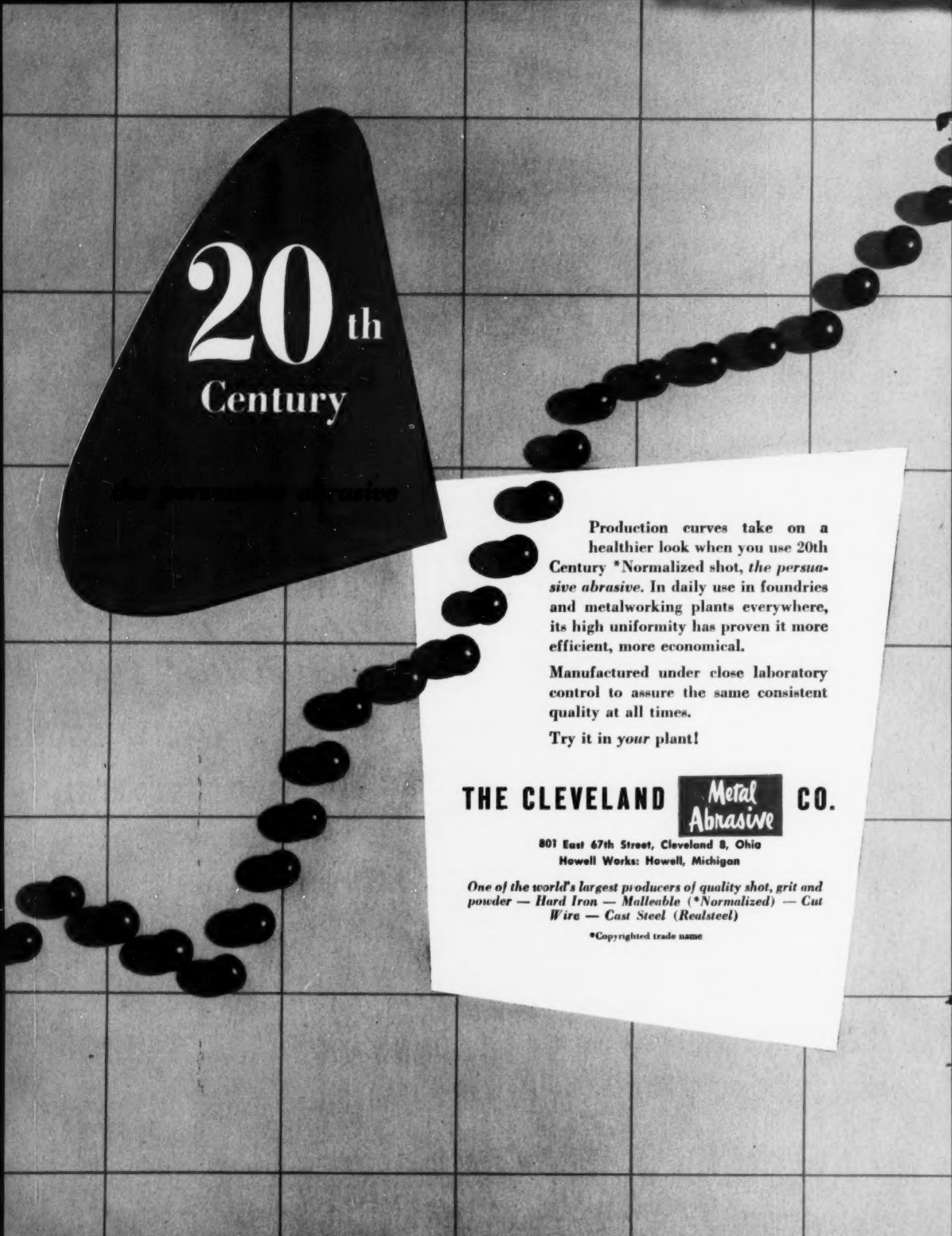

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Production curves take on a healthier look when you use 20th Century *Normalized shot, *the persuasive abrasive.* In daily use in foundries and metalworking plants everywhere, its high uniformity has proven it more efficient, more economical.
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Try it in *your* plant!
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*One of the world's largest producers of quality shot, grit and powder — Hard Iron — Malleable (*Normalized) — Cut Wire — Cast Steel (Realsteel)*
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Talk of the Industry

NEW CAST STEEL FREIGHT CAR WHEEL of Southern Wheel Div., American Brake Shoe Co., will be produced in a $3,500,000 wheel plant to be completed in 1954 in Calera, Ala. Under development since 1941 and in test for six years (2,500,000 car-miles), the wheel contains 1.5 per cent carbon and other elements which make it similar to die steel. The new wheel is intended for the most severe freight service. Southern Wheel will continue production of the standard chilled freight car wheel.

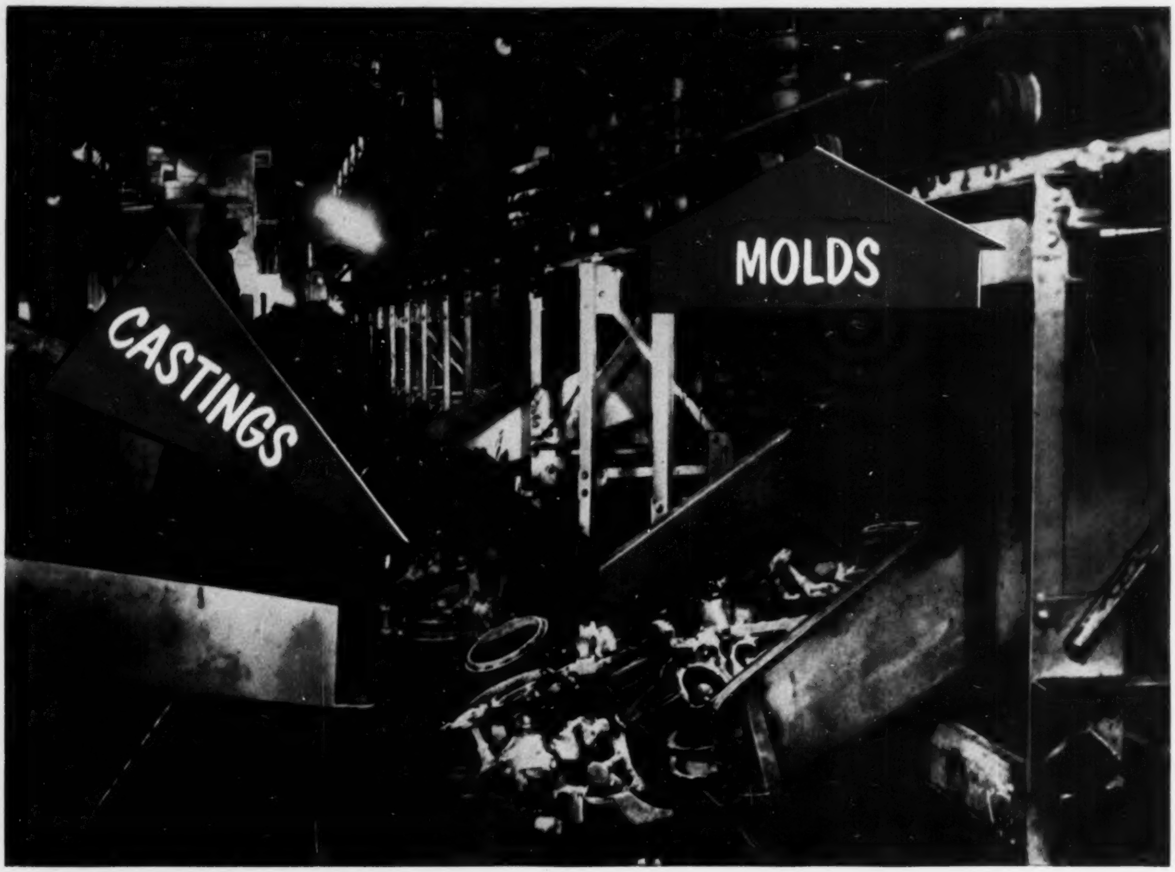
MACHINES FOR HIGH-PRESSURE MOLDING will not be massive like the huge hydraulic presses used in the metal-working industry, contrary to foundry industry opinion. Word is that the hydraulic squeeze strip machines developed for high-pressure (up to 800 psi) work include many stock molding machine parts. The equipment doesn't jolt because jolting, tucking, peening, and ramming aren't necessary at high-pressures. Moreover, the sand is so flowable that jolting makes it jump up and down in the flask.

LATEST DEVELOPMENT IN AUTOMATIC MOISTURE CONTROL makes a condenser out of a body of sand - the sand grains correspond to the insulator, the moisture to the conductor. Capacitance changes markedly with water content to give accurate average reading of moisture in a batch, bin, or even on a conveyor belt.

STRENGTHEN PATTERNMAKING APPRENTICESHIP throughout the country by increasing the number of patternmaker apprentices (within established ratios) and reducing the number of drop-outs, is the advice of W. F. Patterson, director, U. S. Bureau of Apprenticeship, speaking at the 66th anniversary of the Pattern Makers' League. Unlike some other crafts, he warned, pattern-making cannot, in times of emergency, be broken down into component parts and subdivided into jobs of lesser skills. To supply 450 new journeymen each year, 2,800 apprentices must be in training (5-year program) at all times. The 450 represent 2.9 per cent loss (all causes) among the 15,000 journeymen patternmakers employed today. The extra apprentices in training are needed to make up for the 25 per cent drop-outs. On April 1, there were only 1,275 registered patternmaker apprentices plus some small undetermined number not registered, Patterson stated.

MINIATURE FLUIDITY TEST PIECE developed in England by T. P. Yao retains accuracy of the Saeger-Krynitsky spiral but is much easier and faster to mold and use. Yao's specimen has a semicircular cross-section of 3/16 in. diameter and 1/4 in. spacing. He rams it in a round pouring bush 3 in. high and 3-1/2 in. in diameter.

HOW SAND INFLUENCES CORROSION RESISTANCE of stainless materials may be determined in a study under way at Worthington Corp. Surface finish, especially porosity and microstructure, and type of surface preparation are considered important factors. Up to now, little work in this field has been attempted.


MOLDS
CASTINGS

Products & Processes

Fill out postcard below for complete information on products listed in these pages.

Continued from page 10

CONVENIENT FORM FOR ORDERING INFORMATION

Materials Handling

Illustrated catalog describes features of new Tracto-Loader. Hydraulic torque converter drive and specially designed clutch-type transmission aid performance. Variety of interchangeable attachments widen the usefulness of the equipment. Claimed to load faster, provide steady flow of power to drive wheels, eliminate clutching while loading, and load bucket in higher gear. Literature sent on request. *Tractomotive Corp.*

For more data, circle No. 16 on card

Titanium-Aluminum Alloys

New York firm has expanded its production activities and has begun a program of volume marketing of titanium-aluminum alloys. Principal product will be 5% titanium alloy, used in aluminum foundries. Titanium-aluminum is master alloy used as additive to aluminum alloys to promote reduced grain size and improve mechanical properties of finished product. *Alloys & Products, Inc.*

For more data, circle No. 17 on card

Industrial Communications

Compact new Telecrane transmitter-receiving unit is a two-way voice communication system for industrial use in such applications as cranes and other mobile equipment. Helps coordinate operations, speeds productions, promotes safety, reduces delays in materials handling, according to manufacturer. Clear, direct voice communication is audible above noise level of plant operations, using heavy-duty FM system, which eliminates transmission and other interference noises. No new or additional wiring connections needed. Employs existing electrical circuits for transmitting carrier waves. Coupling capacitor joins carrier frequency to any AC or DC power line. For isolated locations, battery operated circuits available. Unit is tray-mounted to facilitate servicing. Extension microphone for crane. *Mine Safety Appliance Co.*

For more data, circle No. 18 on card

Translatory Sander-Polisher

Manufacturer announces new, translatory action sander-polisher for sanding, filling, feathering and polishing metals, enamel, other surfaces. Two counterbalanced heads eliminate all centrifugal force, produce finished results without swirl marks, scuffing or burning, it is claimed. Weighs 8 lb, is available in either electric or air operated models. *Cyclo Mfg. Co.*

For more data, circle No. 19 on card

Cold Process Solder

This new, improved plastic metal base cold process solder is claimed to be ideal for filling imperfections in castings, patterns, machinery, and other metal surfaces. Duro Solderweld #53 is a metallic plastic in putty form. Solder is applied cold, only tool required is spatula or putty knife. Dries to metal hardness when exposed to air, generally requiring 20 minutes at 70 F or warmer. When dry, can be ground, filed, or sanded down to a level feather edge. No high degree of skill or special tools are required in its use. *Woodhill Chemical Co.*

For more data, circle No. 20 on card

Reader Service Dept.

53|8

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Free Foundry Information

For additional information use postcard at bottom of this page

Flask-Lift Machine

Tabor Bulletin No. 551 describing full line of Tabor flask-lift machines in foundry applications is now available. Information includes complete specifications and capacities for jar flask-lift, plain squeeze flask-lift, and jar squeeze flask-lift machines. Entire line illustrated by photographs and diagrams. *Tabor Manufacturing Co.*

For more data, circle No. 21 on card

Surface Grinders

Wide variety of surface grinders and their special features is described and illustrated in DoAll Co.'s new catalog. The factors behind the grinder feed controls and other outstanding features of these new grinders are explained in detail. Notable among attachments are those which adapt grinders to automatic operation for plunge form grinding or surface grinding. Other new attachments for the grinders described in catalog include combination horizontal-vertical high speed spindle, variable speed spindle, crush dressing spindle drive, motorized column raiser, and other items. Accessories also shown. *DoAll Co.*

For more data, circle No. 22 on card

Cutting-Off Wheels

Latest booklet of the Grinding Wheel Institute, covers usage, classification, machine and wheel speeds and mountings, as well as many other subjects such as techniques and handling of the work. Copies of the booklet which was prepared by the Safety Committee of the Institute are available. *Grinding Wheel Institute.*

For more data, circle No. 23 on card

Refractory Linings & Patches

To show the scope and application of the Bondact process for fast mechanical ramming of refractory linings and patching of foundry equipment is the aim of this new brochure. Booklet explains how ganister clay refractories have the advantage of complete uniformity without layer or block effects. *Eastern Clay Products Dept., International Minerals & Chemical Corp.*

For more data, circle No. 24 on card

Electronic Core-Baking

Single, self-contained unit for baking foundry sand cores automatically, continuously, economically, safely is described in 11 page booklet. Testimonial articles by foundries using Girdler equipment are included, and answers to questions most frequently asked about electronic baking are listed. Contains much valuable data on this advanced core handling process. Booklet claims world's largest high frequency dielectric heating installations are designed and built by—*The Girdler Corp.*

For more data, circle No. 25 on card

Shrinkage Conversion Table

Decimal shrinkage conversion table for laying out and checking patterns is now available. Tables took one calculator a full month to calculate, and a second calculator another month to check. Designed like a large wall calendar, tables are printed in large easy to read numbers. *City Pattern Foundry & Machine Co.*

For more data, circle No. 26 on card

New Consultant Service

A new management consulting and engineering service is announced for the Western Michigan area. Six primary areas are involved: organizational planning, business analyses, coordination of sales and production, industrial engineering, industrial relations, and operating controls. Write for full information. *George & Dix.*

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53|8

Please send me detailed information on the Foundry Information circled.

1 2 3 4 5 6 7 8 9 10

11 12 13 14 15 16 17 18 19

20 21 22 23 24 25 26 27

★ Please print or type information below

NAME

TITLE

COMPANY

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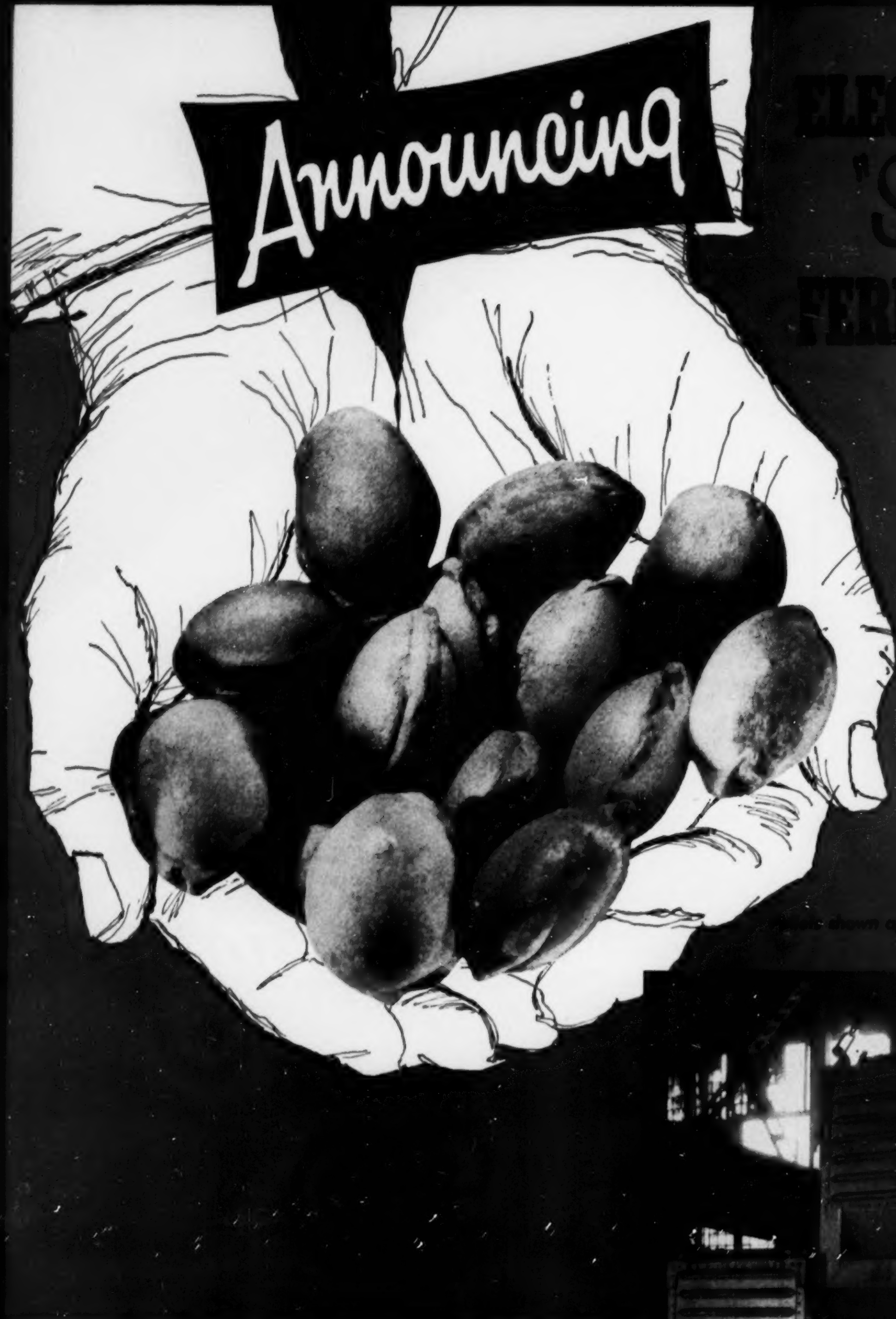
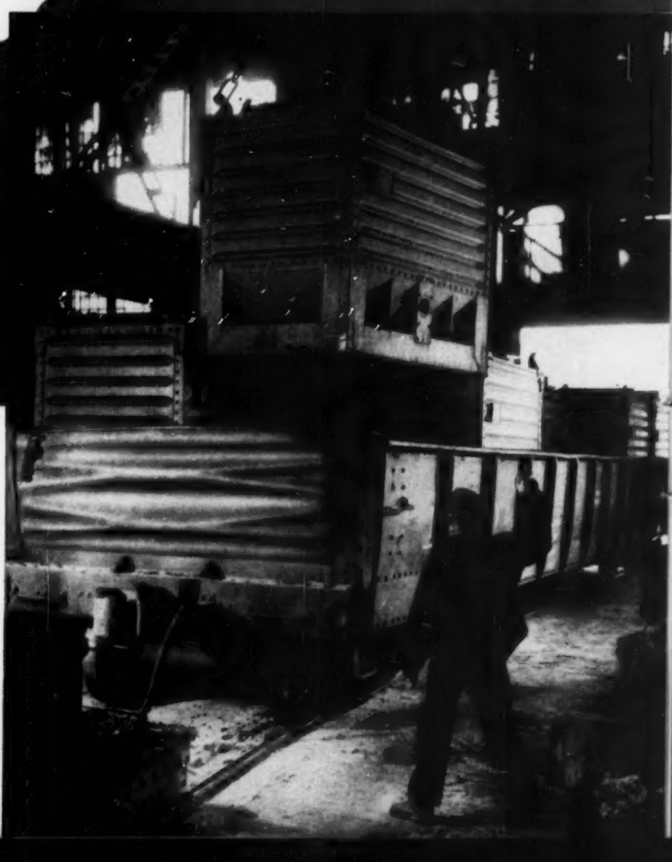
CITY AND ZONE



ELECTROMET'S "Simplex" FERROCHROME

REVOLUTIONARY DEVELOPMENT AIDS IN THE PRODUCTION OF STAINLESS STEEL

shown approximately 3/4 actual size.



1 EASY TO HANDLE

SIMPLEX pellets are usually shipped in bulk in container cars. Each container holds up to 10,000 lb. of material. As many as 12 containers, holding a total of 56 tons, can be shipped in one car. This makes it easy to handle large quantities of ferrochrome fast and economically, and prevents contamination.

The terms "Electromet" and "Simplex" are trademarks of Union Carbide and Carbon Corporation.

SIMPLEX ferrochrome is a new chromium alloy specially developed by Electro Metallurgical Company to simplify the production of stainless steel. The alloy is suitable for producing all grades of stainless steel and is specially adapted for the extra-low-carbon grades.

Outstanding advantages of SIMPLEX ferrochrome are its extremely low carbon content and surprisingly rapid solubility. These characteristics make it possible to reduce furnace time substantially, and to obtain a consistently high recovery of chromium together with a high metallic yield.

SIMPLEX ferrochrome is uniformly sized. It is produced in the form of pellets about the size and shape of a walnut. It contains about 65 per cent chromium and about 6 per cent silicon. The carbon specification is 0.025 per cent maximum. Maximum 0.010 per cent carbon can be furnished.

For additional information phone, wire, or write one of the ELECTROMET *offices. Ask for the* ELECTROMET *booklet entitled, "Melting Low-Carbon Stainless Steel." It shows the advantages that can be obtained in producing low-carbon stainless steel with* SIMPLEX *ferrochrome.*

ELECTRO METALLURGICAL COMPANY

A Division of Union Carbide and Carbon Corporation

30 East 42nd Street UCC New York 17, N. Y.

Offices: Birmingham • Chicago • Cleveland • Detroit • Houston Los Angeles • New York • Pittsburgh • San Francisco

In Canada: Electro Metallurgical Company of Canada, Limited, Welland, Ontario

2 LOW CARBON CONTENT

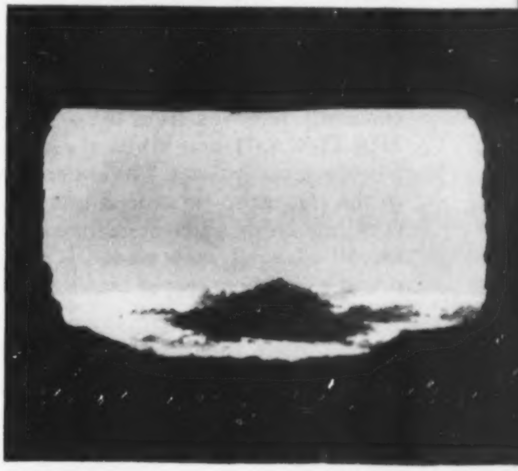
Here is the new SIMPLEX ferrochrome ready for charging in the production of a heat of extra-low-carbon stainless steel. The carbon content of the pellets is so low that the addition of SIMPLEX ferrochrome will not increase the carbon content of the bath.

3 FAST SOLUBILITY

A charging machine dumps a loaded box of SIMPLEX ferrochrome in the bath. Because of the speedy solubility of the alloy in pellet form, as much as 15,000 lb. of SIMPLEX ferrochrome can be added to the furnace in one batch.

4 REDUCES FURNACE TIME

The alloy pellets dissolve in the bath more readily than does conventional lump ferrochrome. As much as 45,000 lb. of SIMPLEX pellets can be dissolved in slightly more than one hour. This means reduced furnace time.



5 HIGH METALLIC YIELD

The metallic yield averages about 90 per cent when SIMPLEX ferrochrome is used, since the alloy contains enough silicon to reduce metallic oxides in the slag back into the bath. Overall chromium recoveries of 90 to 95 per cent are obtained regularly.

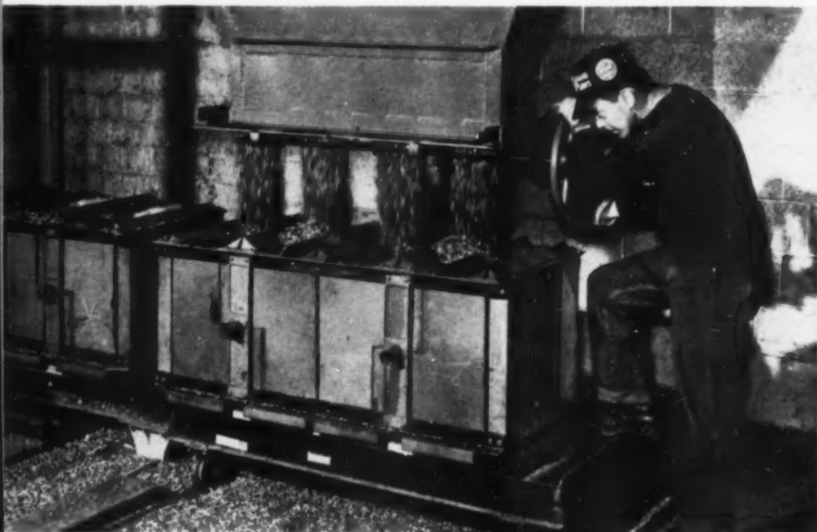

SIMPSON

THE Number 2 Simpson Mix-Muller shown at the left is turning out a 1500 lb. batch of mulled sand and resin every 15 minutes for automatic shell molding operations at Production Pattern and Foundry Company, "without generating harmful heat while blending and coating". The president of this up-to-date Chicopee, Massachusetts foundry goes on to say . . . "Previously, we had attempted to use another type of mixer. It did not do the job"!

The mix being prepared in the Simpson Mix-Muller is made up of 6% dry resin and 94% dry lake sand. No moisture is used. The intensive rubbing, smearing action of the Mix-Muller provides a completely uniform blending of materials that proves superior for use in the widely publicized automatic shell molding process. From the very first batch, Production Pattern and Foundry Company obtained uniform and satisfactory results.

This modern foundry is also using Simpson Mix-Mullers in their green sand molding line and in their core room . . . and "future sand, resin mixing practice indicates the continued use of Simpson Mix-Mullers in our operation", says Mr. Jahn, who is also president of Shell Process Inc., manufacturers of the Automatic Shell Mold Machine shown at left center.

Let our experienced engineering staff show you what Simpson Mix-Mullers can do in your foundry. Write today for further information.



Left: Finished shells are clamped together and placed in a pouring box on a roller conveyor. The boxes then proceed to a packing station where ordinary gravel is fed from a hopper above. The flow of gravel into the box is controlled by slide gates.

Right: After packing, the boxes, still on the roller conveyor, proceed to the metal pouring station, remaining on the conveyor until the castings are cool enough to shake out.

National Engineering Company
(Not Inc.)
600 Machinery Hall Bldg. • Chicago 6, Illinois

SIMPSON *Intensive* MIX-MULLERS

NATIONAL SAND and MOLD HANDLING EQUIPMENT
NATIONAL SAND RECOVERY SYSTEM

Foundrymen in the News

Willard F. Rockwell, Jr., president, Rockwell Mfg. Co., was recently selected as one of Pittsburgh's "100 Outstanding Young Men" by a committee of civic leaders. The men were chosen on the basis of past accomplishment, civic contributions, and future promise.

Lester B. Knight, president, Lester B. Knight & Associates, Inc., recently announced the election of **H. E. Fellows** as vice-president of the firm. Mr. Fellows has held numerous executive and consulting positions in the United States and Europe. He will be in charge of the survey division.

Dr. J. F. Thompson, chairman of the board, International Nickel Co., Inc., announces the election of **John A. Marsh** as vice-president of the company. He will be in general charge of all plant operations in the United States.

International Nickel Co. of Canada, Ltd., has elected **J. Roy Gordon** as vice-president and general manager of Canadian operations. He had been assistant vice-president since 1947 and assistant general manager since 1952.

Stephen H. Badgett is now vice-president in charge of manufacturing, Schaible Co., according to a recent announcement from the Cincinnati firm. Mr. Badgett was with Pressed Steel Car Co. for 12 years as director of engineering and works manager.

Campbell, Wyant & Cannon Foundry Co., Muskegon, Mich., has appointed **Henry McKeen** as sales manager, assuming the duties vacated by the sudden death of **David J. Vail,** vice-president and sales manager of the firm.

George W. Anselman has opened offices as a foundry engineering consultant and will operate out of Rockton, Ill. Mr. Anselman was formerly with Beloit Foundry.

Jack P. Holt, sales engineer, has been appointed to direct the new St. Louis sales office of Basic Refractories, Inc. He has been with the firm since 1950.

A metallurgist chemist from Calcutta, India, **Siba Gapal Chakrabarti,** recently joined the staff of Sam Tour & Co., Inc., New York. Mr. Chakrabarti is in the United States to participate in the State Department exchange-visitor program.

Buckeye Prods. Co., Cincinnati, has announced that **Gale Call** will represent the firm as a sales engineer in eastern Ohio, western Pennsylvania, West Virginia, and eastern Kentucky.

John W. Courtney, Detroit area manager for crucible sales, Electro Refractories & Abrasives Corp., has been named "Man of the Year for '53" by the Notre Dame Club of Dearborn, Mich.

Gunite Foundries Corp., Rockford, Ill., has promoted **F. W. Thayer** to works manager in charge of foundry operations. He has been with the company for more than 7 years.

Frank Warga has been promoted to general foundry foreman, AiResearch Mfg. Co., Los Angeles. He will have

S. H. Badgett . . . manufacturing V. P.

Jack Holt . . . St. Louis director

charge of the aluminum foundry in the company's new South Pasadena plant.

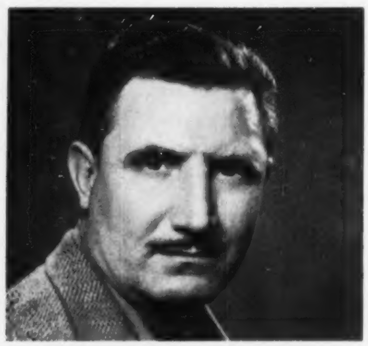
Named a full research metallurgist at Armour Research Foundation, Illinois Institute of Technology, **Robert R. Denison,** former contact metallurgist with Sheffield Steel Co., Houston, Texas, will specialize in application at the Foundation.

Kenneth E. Robinson is now with the industrial hygiene department, Research Labs. Div., General Motors Corp. He went with GMC after 10 years in the Michigan State Department of Health.

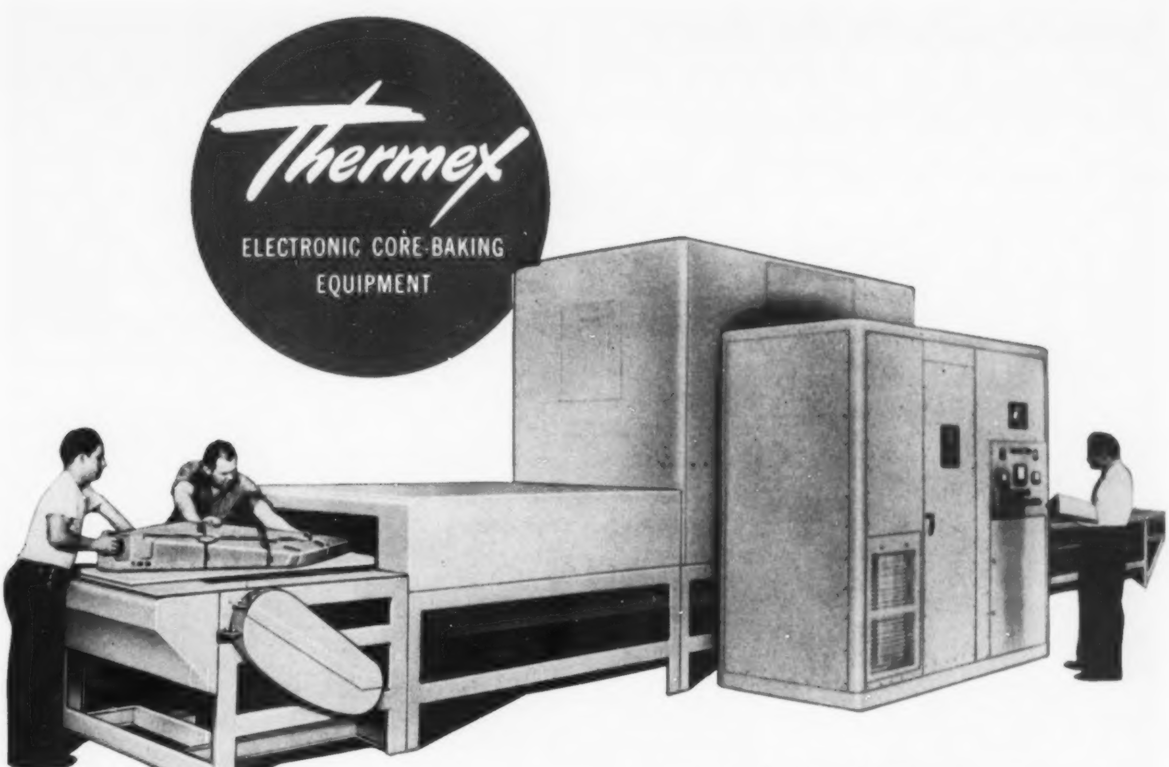
continued on page 28

W. F. Rockwell, Jr. . . . Outstanding

H. E. Fellows . . . Knight vice-pres.



Gale Call . . . Buckeye sales



BAKES 300-LB. CORE IN 10 MINUTES!

BAKING TIME, usually more than 4 hours for a 300-pound core like this, was reduced to 10 minutes by THERMEX* Electronic Core-baking Equipment.

Big or small cores . . . this THERMEX Core-baking Unit takes them all in stride at a rated capacity of two tons per hour. Speed . . . the factor that cuts costs, increases profits and brings in business is the outstanding advantage of this big, versatile, core baking unit.

Foundries using THERMEX Core-baking Equipment report greater core room yields, since rejects are sharply reduced. Castings have fewer irregularities. Uniform heating eliminates stresses, and greatly improves dimensional stability.

Get the latest facts for yourself—send the coupon now. The Girdler Company, Thermex Division, Louisville 1, Ky.

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Please send me the new booklet on Electronic Core-baking.

Name ....

Position ....

Company ....

Address ....

City .... *State* ....

Foundrymen in the News

continued from page 26

Lloyd A. Mapes has been added to the staff of North American Smelting Co., Wilmington, Del. He had been associated with NPA in Washington, D. C. since 1951, and has had wide industry experience.

John C. Walsh has been appointed superintendent of both the Lamson and Greenway plants of the U. S. Hoffman Machinery Corp., Syracuse, N. Y.

Jesse J. Baum has been appointed supervisor of American Cast Products, Inc., at the Orrville, Ohio works. Mr. Baum recently was affiliated with American Steel Foundries, East Chicago, Ind.

John L. Keating is now production manager, Cooper Alloy Foundry Co., Hillside, N. J. He was formerly a consulting engineer with W. W. Slocum & Co.

Gray Iron Founders' Society, Inc. recently announced that **Robert E. Berry** had joined its staff as assistant to the executive vice-president. Berry graduated from Kent State University in 1950 with a BBA degree.

Neil Franklin Meredith has joined Basic Refractories, Inc., Cleveland, as technical assistant to Dr. Max Muller, vice-president in charge of operations.

The appointment of **Jack D. Colyer** as sales manager of Bellevue Industrial Furnace Co., Detroit, has been announced. Prior to his present position, Mr. Colyer was acting as a sales consultant for several Detroit companies.

L. M. Wallace, retiring general traffic manager of A. P. Green Fire Brick Co., Mexico, Mo., was honored at a testimonial dinner recently. He retired after 34 years of continuous service with the company. **K. C. Dillman** was appointed to succeed Mr. Wallace.

Arnold N. Kraft, formerly foundry manager of Wilkening Manufacturing Co., Philadelphia, Pa., has been appointed branch manager of the Linden, N. J., plant of Mather Spring Co., Toledo, Ohio. Mr. Kraft was chairman of the Philadelphia Chapter, American Foundrymen's Society for 1952-53.

Roland D. Block has been appointed plant metallurgist for the Michigan

R. E. Berry . . . on G.I.F. staff

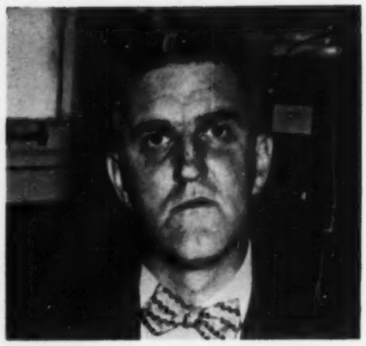
N. F. Meredith . . . technical asst.

A. N. Kraft . . . branch manager

Tool Products, Detroit, Mich. He was formerly plant metallurgist for Alten Foundry & Machine Works, Lancaster, Ohio.

Harold N. Bogart, supervisor of manufacturing research, Ford Motor Co., Detroit, Mich., has obtained a one-year leave of absence to attend Massachusetts Institute of Technology.

M. A. East is now president and general manager of the John East Iron Works., Ltd., Saskatoon, Sask., Canada.



J. C. Walsh . . . superintendent

J. J. Baum . . . joins American

J. L. Keating . . . production mgr.

He was formerly managing director of the firm.

Juan Latapi, technical assistant to the president, Fundiciones De Hierro Y Acero, S.A., Mexico City, has been visiting in the United States, where he has been inspecting various foundries in order to investigate methods of producing railroad castings. Mr. Latapi has been very active in the Mexico City Chapter of A.F.S.

C. I. Wallace, manager, Industrial Filtration Div., U. S. Hoffman Machinery Corp., Syracuse, N. Y., has appointed Leonard E. Petzinger as sales engineer for the Cleveland area. Mr. Petzinger has served in this capacity at Cincinnati for $1\frac{1}{2}$ years, which area he will retain.

COMPARISON TABLE

SAND CORES	AlSiMag STRAINER CORES
Disintegrate under rain or prolonged exposure to moisture.	NOT AFFECTED by water.
Must be handled carefully.	STRONG, stand fast, rough handling.
Some variation in size of cores and openings.	UNIFORM in all dimensions.
Eroded to varying degrees by stream of molten metal. Holes frequently enlarged as metal is poured.	NOT AFFECTED by stream of molten metal at normal pouring temperatures. Hole sizes remain uniform throughout pouring.
Eroded sand sometimes carried into casting by molten metal.	NON-SPALLING under normal metal pouring temperatures.
High percentage of breakage.	VIRTUALLY NO BREAKAGE.
Require hand reaming or cleaning of holes.	Clean, accurate, ready to use.

LET OUR
CUSTOMERS
give you a SALES TALK!

Only a superior, more economical product has the enthusiastic support of its users. These quotations tell you how experienced foundrymen feel about

ALSIMAG®
STRAINER CORES

"We formerly made our own sand cores and thought they cost practically nothing. A careful check showed to our surprise that they cost us almost 3c each, which is more than your ceramic cores cost. Your cores are far stronger, handle faster, do a better job."

"We tested four makes of ceramic strainer cores. Three were unsatisfactory. AlSiMag cores stood up under all tests and we have had no strainer core troubles since using your cores."

"We had a lot of trouble with moisture getting in our sand cores. Your AlSiMag ceramic cores are not affected by any amount of water."

YOU CAN PROFIT FROM THESE EXPERIENCES OF OTHER FOUNDRIES! TRY AlSiMag STRAINER CORES AND LET YOUR OWN EXPERIENCE TELL THE STORY! TEST SAMPLES OF STANDARD SIZES FREE ON REQUEST.

AMERICAN LAVA CORPORATION
A subsidiary of Minnesota Mining and Manufacturing Company

CHATTANOOGA 5, TENNESSEE

52ND YEAR OF CERAMIC LEADERSHIP

Ever Been On A Committee?

▪ Committees have jocularly been defined as groups of people who individually can do nothing, and who get together to conclude collectively that nothing can be done.

A famous jurist expressed his opinion of committees shortly after Lindberg had crossed the Atlantic alone. Think how much more of an achievement it would have been, he said, if he'd had to do it with a committee!

For all their faults, alleged and real, committees are an inevitable and integral part of any organization so large that the entire membership cannot participate directly in formulating policies and developing programs, or whose activities are so diversified that the entire membership is not prepared to participate in every endeavor. In addition, a cumbersome group broken up into small working groups can tackle more problems effectively and simultaneously.

Thus it is with the American Foundrymen's Society, in which some 100 national committees are the vertebrae in the Society's backbone—its technical and scientific program. Each of these committees is made up of a group of specialists who volunteer their services to the foundry industry in its many phases. They are not selected or approved by AFS Headquarters, but entirely by committee and division heads.

Those who volunteer for committee service are motivated not only by an ardent desire to advance the arts and sciences of foundry practice, but also by the realization that committee members in session are at a listening post for advanced foundry thinking. They can counsel with each other on new ideas and new applications of old ideas. The result is beneficial and stimulating, not just to the individual but to his company and to the entire foundry industry.

Management's proven willingness to make plant men available for committee service year after year is sufficient evidence of the value of committee work to the various plants. The quality of the technical program of the annual AFS Convention and the many Society publications illustrate the worth of the committees to the industry the world over.

Committees cover every field of foundry activity in eight specific divisions —Brass and Bronze, Education, Gray Iron, Light Metals, Malleable, Pattern, Sand, and Steel—and the following of general interest: Fluidity Testing, Foundry Cost, Heat Transfer, Plaster Mold Casting, Industrial Engineering, Plant and Plant Equipment, Refractories, Precision Investment Casting, Safety, Hygiene and Air Pollution, and others.

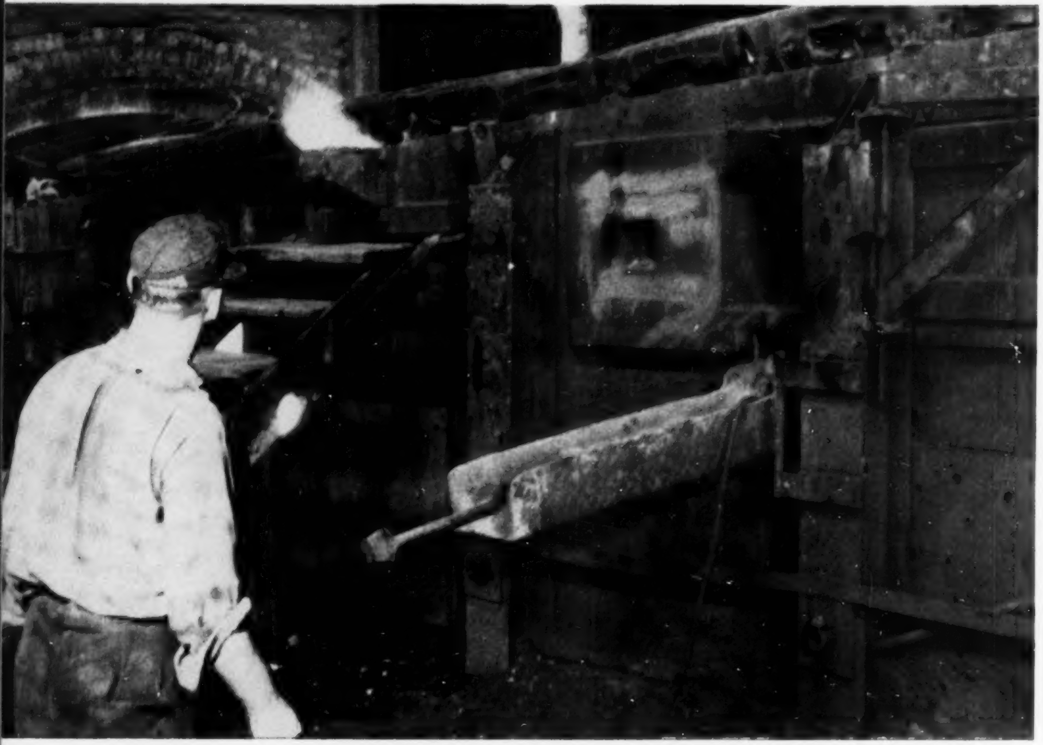
Procedures for division and committee operation are set down in a National Committee Personnel roster, available to anyone at no cost.

We stand on the threshold of an era fraught with unprecedented challenges, cosmic opportunities, climactic tensions and historic responsibilities. In short, the sky's the limit . . . and we've hardly taken off. If, as H. G. Wells says, civilization is a race between education and catastrophe, at least we can join forces and chart the course we intend to take.

Why not join an AFS committee! Prepare a brief statement of experience and send it, along with an expression of interest in some specific phase of committee activity, to American Foundrymen's Society, 616 South Michigan Ave., Chicago 5. It will be handed to the appropriate committee chairman for action.

Hans J. Heine

HANS J. HEINE
Acting Technical Director



"A 6-in flame out of pourback . . . is about right."

Construction and Operation of Coal Fired Air Furnaces

CECIL F. SEMRAU / *Hill & Griffith Co., Chicago**

■ The author's plant operates three periodic, pulverized coal-fired air furnaces. Two are used for jobbing production and one for fitting production. All furnaces were originally of solid bottom construction. The fitting furnace is still so constructed although we have added improvements like water-cooled plates around the skim door opening and have replaced solid type tie rods with water-cooled tie rods. This latter change has definitely overcome the problem of spreading and distortion of furnace structure. The construction and arrangement of the fitting furnace is shown in Fig. 1, which also illustrates the water-cooled tie rod feature in detail.

*Formerly metallurgist, Illinois Malleable Iron Co., Chicago. This paper was presented at a Refractories Session of the 57th Annual Meeting, American Foundrymen's Society, Chicago, May 4-8, 1953.

Several years ago we adopted the practice of using brick bottoms in all furnaces. This proved advantageous in many ways. To improve bottom practice we rebuilt the two furnaces used for jobbing production to incorporate air cooling of bottoms. The construction of these furnaces is illustrated in Fig. 2. Notice that this construction provided for the use of brick sub-bottoms.

To further enhance the air-cooled feature, the space below the bottom plate of these furnaces was enclosed on each side to permit the drawing of cold air from front to back to a vent pipe at the stack end of the furnace. The extent of this induced air cooling has not been determined quantitatively since we had not measured the volume of air that flows under the bottom. The exhaust air temperature averages 120 F. We plan to pursue this matter of air cooling further.

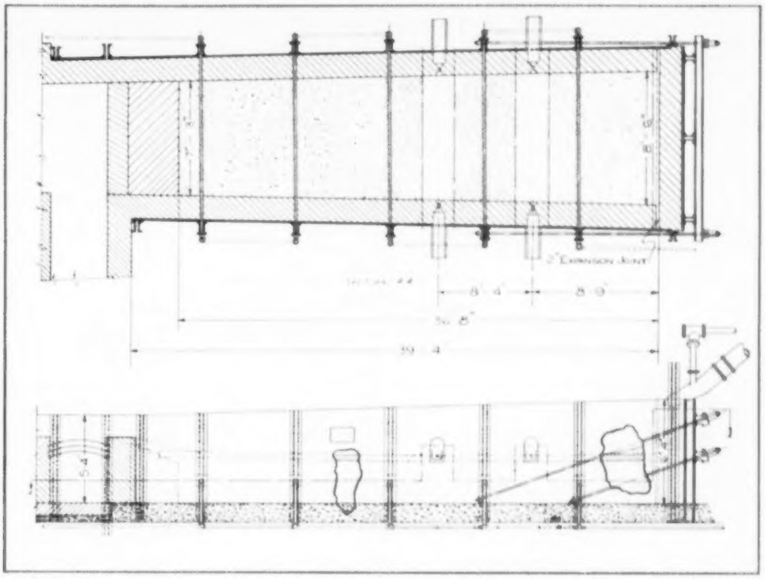


Figure 1

Each furnace is equipped to be operated in conjunction with a Wickes waste heat 400 hp boiler with 3625 sq ft of heating area. Boiler, boiler entry arrangement, and stack by-pass enclosure are illustrated in Fig. 2. Thus we have furnaces on two distinct types of operation, but as every operator well knows even the two jobbing furnaces do not operate alike and present their own idiosyncrasies.

Good Brick Required

The author found that good brick masonry is an essential prerequisite to satisfactory refractory performance and refractory life. Certain practices and procedures have been adopted and we adhere to these rigorously. In describing furnaces and refractories in greater detail we will discuss each enclosure element individually.

We use Missouri 105-13½-in. bungs layed in double row frames as indicated in Fig. 3. The frames are of our own design and cast from gray iron in our own shops. The clamps are similarly cast in our shops.

Joints are broken every third course with a full bung brick and half bungs. We tried using 6¾-in. or half-size bung brick, but found it more economical to obtain half brick by breaking the regular bung brick in two. This may make for a rough break but we can avoid thickness variations that it is impossible to avoid with two different brick. All bungs are layed with fire clay slurry to cushion the brick and eliminate any dimensional non-uniformity.

Frames, clamps and bolts must be kept in good repair. Burned or distorted clamps must be replaced promptly. Frames must be tightened uniformly to hold brick securely. At the end of each frame we use stiff

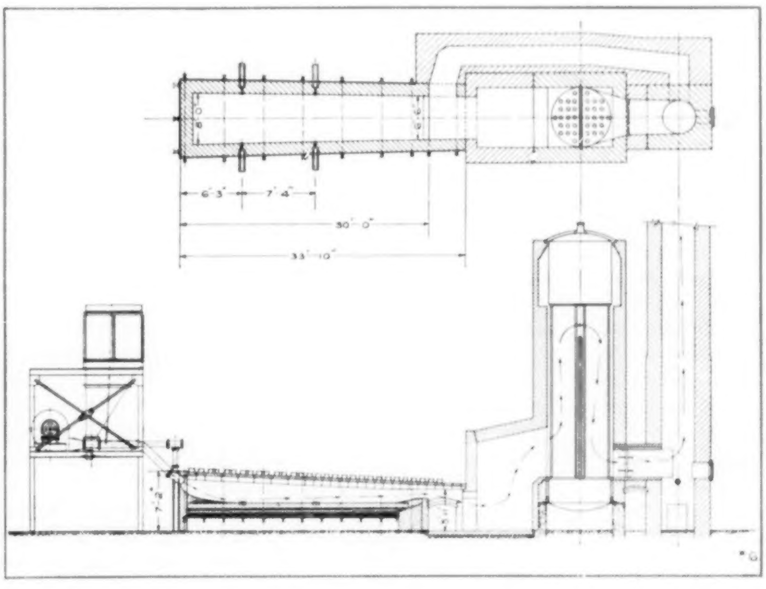


Figure 2

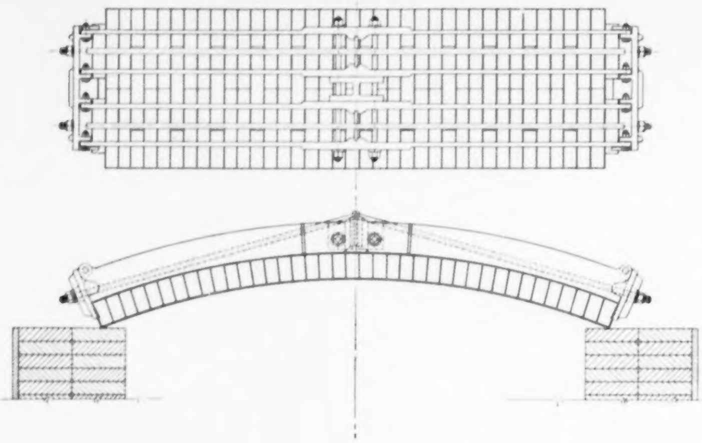


Figure 3

mud No. 2 arches as a bearing surface for the clamps.

Sidewall brick must be layed up with care, particularly below the metal line and around tapouts. Careless masonry is the cause of most run outs. Original installations are always "layed to line" to assure straight walls and level support. Savings in labor, furnace repairs and maintenance, amply justify this added care.

Careful and tight masonry, however, make even more essential the provision for adequate expansion joints to compensate for the reversible thermal expansion of the refractories. Failure to provide for such stresses results in furnace distortion, burner misalignment, and extra maintenance. Suitable expansion joints are provided at sidewall juncture with both burner wall and bridge wall.

Proper Openings Reduce Repairs

Furnace openings frequently are the focus of excessive erosion. Openings designed to proper size, carefully constructed, and protected during melt down can materially reduce sidewall repairs. All jambs should be carefully layed using large 9-in. series for breaking joints. Soaps and series smaller than a regular 9-in. brick should be avoided. Arches over openings are subjected to much abuse. We have found sprung arches better suited than square edge lintle tile. Installation of arches must be done with the proper arch shapes to give correctly aligned radial joints. Skewbacks must be layed with standard shapes to provide a skew face that gives the arch rigid support.

We reduce flame erosion at furnace openings by sealing all openings flush with the inside surface of the sidewalls during melt down. This protects jambs and arches not only against erosion but the excessive thermal differentials that induce spalling.

The burner wall burner port openings must be layed up to dimension not only to provide for structural stability but to provide for proper functioning of burners and directional flow of the flame.

The importance of brick masonry as it affects operation and refractory life was never so forcibly demonstrated as when we started using brick bottoms. In most instances reduced bottom life can be attributed directly to faulty or careless masonry.

Many methods of installation are used. Since our furnaces are tapped from two tap holes on each side we found that convex bottoms were best suited. The details of construction are illustrated in Fig. 4. In the fitting furnace, the brick of the service bottom are layed on sand. In the jobbing furnaces, bottoms consist of a shallow sand fill to support a sub-bottom of two rowlock courses of fire brick. This is covered with a 1½-in. cushion of sand on which the 9-in. service bottom is installed.

These two constructions definitely indicate the desirability of the brick sub-bottom. Where a sub-bottom is not used, constant care must be exercised to assure support. Crude silica sand will pack better and tends to flow away less than washed sand. Each installation must be layed to line and carefully supervised to assure that the bottom has proper contour. The brick sub-bottom, however, is layed to the contour required. The proper contour thus established makes it much easier to replace the 9-in. service bottom with reproducible contour and even less supervision. The 1½-in. of cushion sand makes it easy to remove and replace the service bottom as well as affording additional protection for the sub-bottom.

Rise Is 1½-in.

The spring or rise at the groin section between tapouts is 1½-in. The remainder of the bottom was formerly layed to a similar contour but we have found that it is even simpler to lay bottoms that are flat between sidewalls. The slope in each direction from tapouts is approximately 3 in.

Originally we layed bottoms so that the bottom equidistant between front and back tap blocks was 1½ in. higher than the drain courses at the tapouts.

This assured positive drainage. It was observed, however, that this high spot was such that some metal remained in the back tapout area after the front taps had drained. This resulted in greater slag attack on the front end of the bottom. To minimize this, we now construct the high section closer to the back taps. The furnace drains more uniformly and slag is lessened. Our furnace construction is further illustrated by Fig. 5 and 6.

Special Design Tap-out Used

We use a tap-out of special design (Fig. 4) which is suited to our operations. We feel that the cylindrical section or hole being longer than that of the standard tap-out will withstand more abuse. The bell at each end makes for greater accessibility. We use holes of different size depending upon the size heat, and use both steel bars and cores for plugging. The steel bar is used more often, particularly when the hole erodes.

So far, stress has been on refractory constructions and masonry as a means of keeping refractory consumption in line. Of equal or greater importance is the operation of a furnace. The best refractories installed with the greatest care can be destroyed by careless operational practices. Careful operation pays many rewards. Carefully worked out and controlled operation make it easier on the men, assures better metallurgical control and reduces labor and material costs.

Carefully and orderly charging pay dividends. It assures easy melt down without crowding the burners. It prevents excessive oxidation and minimizes attack and slag erosion of refractories—both sidewalls and bungs.

At Illinois Malleable the average charge runs: 40 per cent pig iron, 50 per cent sprue and hard iron scrap, 2 per cent steel scrap, and 8 per cent malleable scrap. One of the most important controls we have in bringing about an easy and uniform melt down is to control the method and order of charging.

The order of charging employed is indicated in Fig. 7. We first spread the uncleaned hard iron sprue uniformly from front to back starting some 5 ft from the burner wall and extending back toward the bridge wall carrying no nearer the bridge than the size of the heat requires. We attempt to crown this portion of the charge to avoid contact with the side wall.

Then come the hard iron chunks or over iron and the malleable scrap placed as indicated at the front end and back end, respectively, still crowning to keep these portions from piling against the side walls. This placement appears logical in view of the relative resistance to melting of these two materials. The charging procedure up to this point leaves a sizeable space between charge and side walls which we now fill with the clean hard iron scrap. This is followed by the steel charged near the front of the furnace where it is subjected to the direct action of the flame. Malleable scrap is charged toward rear of furnace and the entire charge covered with pig iron.

Why Charge That Way?

Following is the reasoning that led us to adopt this charging procedure. The pig iron, hard iron and malleable scrap melt faster than the sand covered sprue and the flow of molten metal is naturally directed to the back of the furnace to position for easy skimming. The steel and hard iron chunks being in position to be subjected to direct action of the flame are in the most favorable position for rapid melting. During the week when the furnace is hot the hard iron chunks can be charged before the sprue, and melted with no more difficulty.

The loose clean hard iron scrap filled against the side wall protects the side walls from excessive erosion yet provides the desired openness to the charge that prevents complete short circuiting between the top of charge and bungs before melt down. Likewise, the hard iron fillet melts in sequence with the steel and hard iron and pig iron to permit metal and slag flow along the side wall back to skimming position.

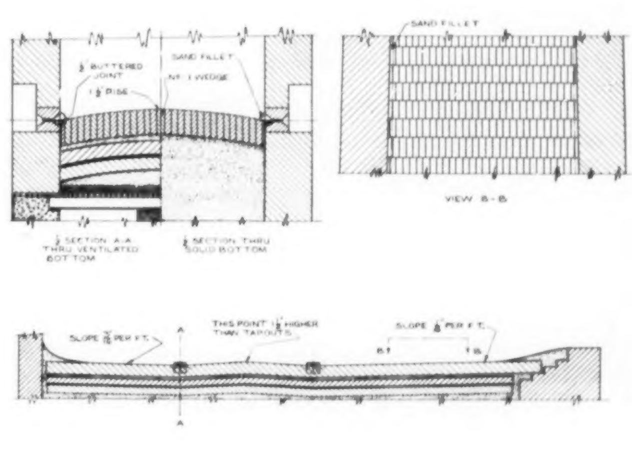


Figure 4

Excessive crowning of a charge should always be avoided to protect side walls, yet the charge against side wall should be such that the melting mass will not be dammed up and confined to the front end of the furnace. Neglect of this important consideration will invariably result in excessive side wall erosion.

Detrimental Method of Melting

We have found that the most detrimental method of melting is to permit faster melting materials (pig iron, malleable scrap, and clean returns) to be charged near the burner end of the furnace. This results in these materials being dammed by semi-molten materials resulting in super-heating, excessive oxidation, and severe erosion of side walls before adequate skimming can be effected. Correct charging and melting guided inflexibly by any time schedule of operation.

Coal prepared in a central pulverized system to furnish fuel for power house, annealing and melting requirements creates problems. The fact that higher carbon iron is melted in one of the three furnaces further complicates fuel preparation. These varying requirements create problems not experienced by the unit pulverizer operator. We must, therefore, adopt a compromise of control in our fuel preparation.

Combustion Control

We control fineness to give the proper combustion rate in our air furnaces. With the coal being used, approximately 94 per cent through 100 mesh and 84 per cent through 200 mesh is the best compromise.

Coarse coal allows the carbon to go up. This we try

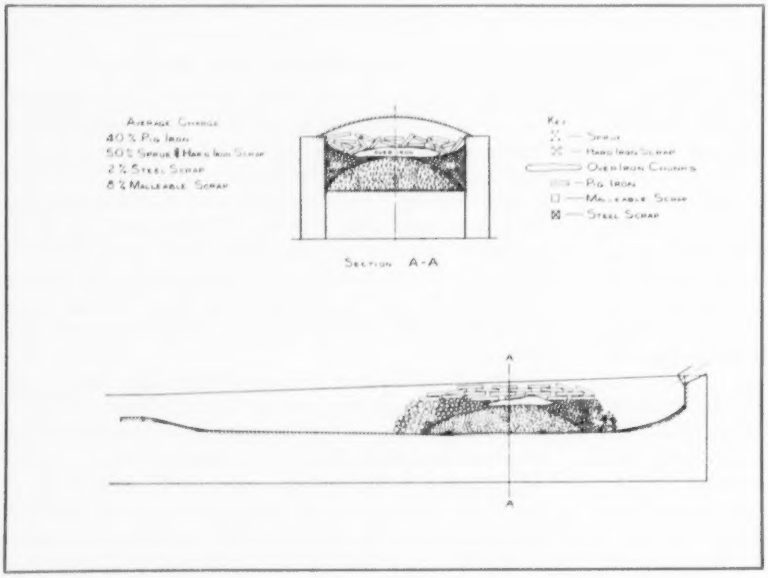


Figure 5

avoids this but any tendency toward this condition should be corrected early in the heat by breaking up the semi-molten restraining portion with a steel bar.

A charge should never be so crowned as to unduly restrict flame travel. It is much more sensible to raise the side walls when necessary to avoid such restriction.

Proper Agitation an Important Factor

One of the most important factors in rapid and efficient melt down is the provision for proper agitation. We induce agitation by the use of green tamarack boughs. On a new brick bottom, the metal circulates readily. Circulation is induced by the flame travel and the pushing which we do with bars. As the bottom becomes eroded the circulation is somewhat retarded and the extra agitation required is easily accomplished with the green boughs.

As the charge melts down slag must be removed as quickly and as frequently as possible. This permits more rapid heat transfer from flame and radiation to metal. Attempting to melt or superheat slag-covered metal excessively erodes side walls. Operators should be instructed to remove slag as formed and not be to control by steel additions to the initial charge or added to the heat during superheating. This is difficult for it is hard to dilute the carbon as fast as it is deposited and absorbed.

Fine coal on the other hand is equally troublesome since it not only oxidizes the metal, but the oxide slag resulting excessively erodes side walls. Operators are also aware that highly oxidized heats, regardless of final analysis by furnace additions, lose their life. Such heats are difficult to pour satisfactorily and often cause a higher percentage of misruns.

Control of preparation depends upon the type and source of coal used. We have standardized on a West Virginia coal of the following average analysis (dry basis):

Ash	3.75	per cent
Volatile	36.50	" "
Fixed Carbon	59	" "
Sulphur	0.85	" "
BTU		14,750

This coal is somewhat denser and does not pulverize as freely as the lower volatile coals generally used.

One essential in successfully using this type of fuel is to carefully control the moisture. We have found that moisture should be under 0.5 per cent to assure most satisfactory handling through the screws and uniform flow through burners. Damp coal retards combustion rate and slows up melting of the charge directly in front of the burners. This often results in irregular burn out patterns—more severe erosion in the rear end of furnace walls.

The most successful flame in our practice is one which gives adequate turbulence to effect complete mixing of fuel and air. This requires careful control of flame velocity (as well as proper charging) to produce the desired turbulence and mixing. Excessive flame velocities cause more rapid erosion of side walls and bungs. Flame velocity also affects the rate of heat transfer and radiation to metal during a heat run.

The twin burners in each furnace are identical. Details of each burner are illustrated in Fig. 8. It is most essential that burners be properly aligned to assure smooth melt down and minimize refractory erosion. We have adopted a very simple practice for determining flame travel. We attach two 10-ft streamers of 1-in. gauze bandage centered inside the burner castings in such a way that the loose ends will be caught in the blast and blown forward in the furnace. This indicates the path of air fuel travel. We adjust our dual burners so that the two ends of the gauze meet about 8 feet ahead of the burners and adjust so that they meet at the exact center of the furnace. Air flow can be adjusted by the two dampers in each burner.

Sufficient checking indicates that this practice on an empty furnace is indicative of proper flame alignment when charging is carried out according to the specifications already described.

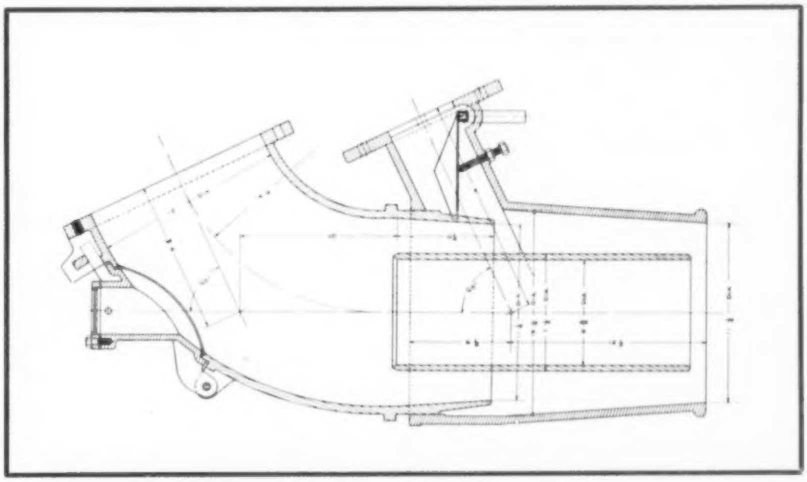
No discussion of charging and firing is complete without emphasis on draft control. Rigid control of back pressure is, in our opinion, the most useful factor in melting. Perhaps the most important factor in controlling draft is the provision for proper opening over the rear bridge wall. Adjustment of stack draft is necessary but in itself is inadequate without the proper bridge wall opening.

Our practice is based on observation of the nature of the flame over the bridge wall and the back pressure as indicated by the flame out of furnace openings. We find that a 6-in. flame out of the pour back opening is about right in our practice.

Metallurgical Control

With the careful construction and operational practices described, we find little trouble in melting to satisfactory analysis, and obtaining iron of good flowability that will yield good sound castings that are easily annealed.

Figure 6



Our operational practice makes melt down easy and well scheduled. Our control is accomplished by test ladle observations, close observation of test sprues, and preliminary analysis. Test ladle observations are made at frequent intervals from melt down to tapping time. Three sprues are taken; one at melt down, one when preliminary sample is poured (one hour before tap time), and the third about 15 to 20 minutes before tap time.

Correlating these three methods of metallurgical control gives a good idea of the nature of the heat we are pouring. We feel that careful control of operation facilities assures close metallurgical control without the use of excessive furnace additions and adjustments as well as assuring against undue refractory failures. Failure to follow carefully planned operational control results in variable heats, excessive adjustment and excessive pouring temperatures, to say nothing of the increased labor and refractory costs.

The author wishes to express his thanks to G. B. Stantial, works manager, as well as the Illinois Malleable Iron Co. for permission to prepare this paper.

It Costs More Than You Think

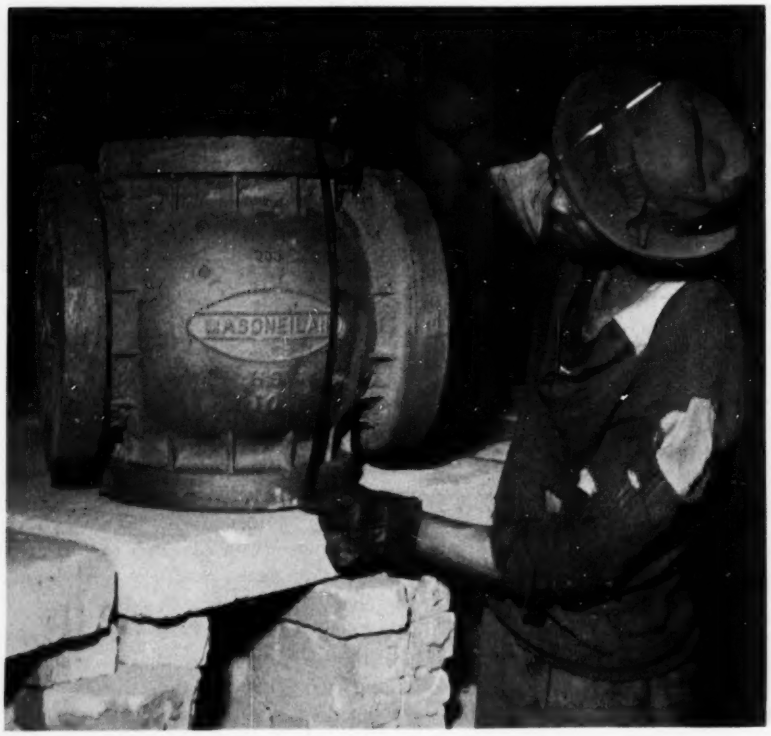
HAROLD BROWN / *Sales Engr., Hunt-Spiller Mfg. Corp., South Boston, Mass.*

A shrewd buyer of castings weighs not only the initial price but also the behavior of the casting from receipt through ultimate use in the field. What purchasing agents should look for, and what foundries can do for their customers are outlined by a man who deals daily with purchasing agents.

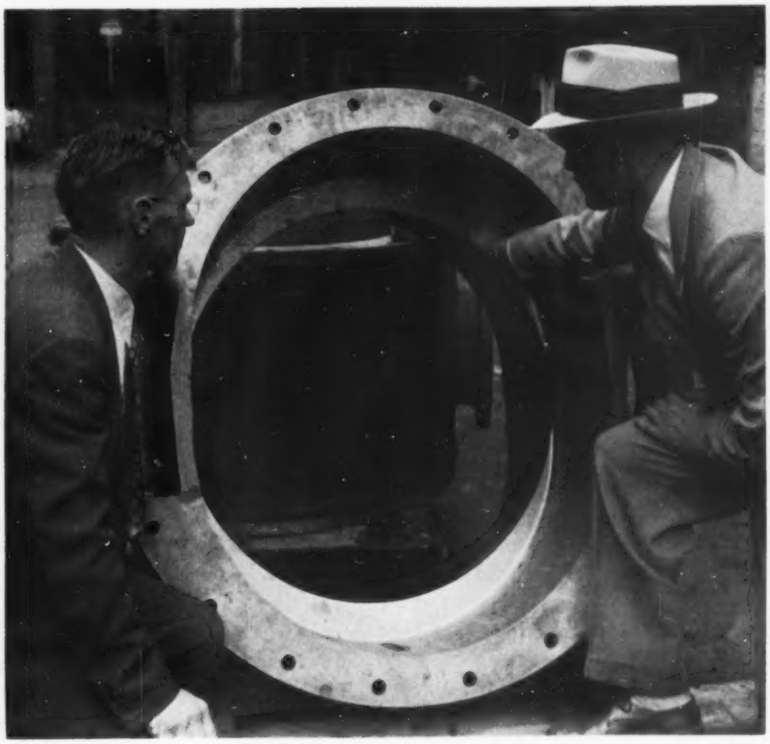
■ Dollar value of casting consumption in any company may range from several hundred to several million dollars. Thus, a fertile field for effecting large savings is offered and the buying habits of a purchasing agent may influence the profit and loss statement at the end of the year by thousands of dollars. Firms using large quantities of castings may employ a former foundry superintendent or casting specialist to handle these purchases exclusively. Such a man who knows what to look for, and where to find it, earns his salary many times over. In other companies, this function is handled by the regular purchasing agent in addition to his other duties.

It is axiomatic to use more than one foundry to satisfy casting requirements of any sizable quantity. This is protection against charges due to business conditions which are not readily overcome. It also permits the purchasing agent to utilize the facilities of each foundry that are most compatible with a particular casting. In making these choices, a cost-conscious purchasing agent will find it helpful to weigh the following ten factors before designating a casting supplier for any one job.

Initial Price. Of course the initial price is important.



A large valve casting being inspected for rough cast finished dimensions. Close adherence to finished dimensions may save the customer money in finished weight and machining time because of absences of extra metal resulting from faulty molding practice



Author points out blowhole defects to Don Kane in large cylindrical casting. These defects were not apparent until considerable machining had been effected, and they were of such severity that the casting had to be rejected. Conditions such as these are not always reflected in the initial price and should be considered by the shrewd purchasing agent.

When all the quotations for a job have been assembled, examination of prices will quickly reveal those suppliers to be actively considered. Abnormally high prices ranging from 140-200 per cent of the average may means a supplier (1) does not have facilities suitable for casting the part in question, or (2) his operation and equipment are inefficient though the quality of casting may be satisfactory.

Prices markedly below the average may indicate a foundry selling at a loss to keep production at a desired level. This may result in (1) prices being raised at a later date once the job is in, causing complaints in the buyer's own cost department, or (2) insufficient attention may be given to the job when the foundry receives more profitable work from other customers.

Engineering Characteristics. The application for the particular casting is important. For example, the quality of iron required for a critical cam in a packaging machine to be sent overseas may be much higher than iron required for a solid flywheel, where weight only is needed. It is much more economical to pay more for a cam that will give excellent wear resistance and service life than to use a less expensive cam of inferior iron which will break down in service causing customer dissatisfaction and costly repair charges.

Special jobs may specify definite physical requirements in say, tensile strength, hardness, or grain structure. Foundries that do not possess good metallurgical controls will not be able to consistently meet these requirements. Just one bad shipment can be very costly in lost-machining time, production hold-ups, service break-downs and most important—loss of customer good-will. It may cost more at the start for a controlled and uniform material whose physicals can be adapted to individual requirements. But it is cheap insurance against losses incurred with faulty castings during future operations.

Physical Condition. Attention should be paid to the physical condition of the casting when it arrives at the plant. Sand inclusions or just plain dirty castings may cause headaches in subsequent machining operations. Down machining time or dulled and broken tools cost money. Extra labor may be involved in scraping off sand or grinding down gates or risers that were not properly removed in the foundry. Each supplier's castings should be checked to insure that they are arriving in a satisfactory condition.

Internal Defects Costly

Internal Defects. Castings with internal defects such as shrinkage, hard spots, blow holes, or non-metallic inclusions constitute a major source of hidden costs. The fact that a shrinkage cavity is beneath the surface can be responsible for a formidable amount of lost machining time and production tie-ups. A foundry that can constantly supply sound castings for parts which require multiple machining operations can charge much more initially than a competitor producing castings with internal defects and still be the more economical source.

A cost-conscious purchasing agent will continually check with the machine shop for complaints regarding such defective castings. Hard spots or inclusions can also quickly add to the cost in subsequent machining operations.

Location of Source. The proximity of a supplier may result in favorable freight differentials. For example, it costs \$1.70/100 lb to ship rough castings from Chicago to Boston. To this is added 15 per cent of the entire freight bill and three per cent tax. It is well to con-

Adequately heavy risers insure dense grained metal and a shrinkage-free casting, a valuable factor where considerable machining or critical service is involved.

sider this point when all other factors are equal. For many companies there may be considerable convenience in dealing with a local small foundry. Ability to give practically overnight service on rush jobs can well compensate for other deficiencies. Larger foundries may offer technical services which can be more readily used if they are close-by.

Price Per Piece Marks Progressive Foundry

Pricing System. With the more extensive use of accurate cost analysis systems in the foundry industry, there has been a growing tendency to charge on a per piece basis rather than on a per pound basis. Each job is then priced on its own merits rather than charging for all work on a flat rate per pound basis. This method is becoming increasingly popular with both customer and supplier for it has several distinct advantages. Foundries utilizing this system indicate that they are probably progressive and efficient. They know their costs and will neither charge too much or too little.

The disadvantages of an excessive price are obvious. To undercharge may eventually cause the supplier to go out of business with the loss of perhaps a very reliable supplier. Or even worse—the foundry may realize later that the job is unprofitable and either start cutting corners on quality and service or attempt to raise prices with subsequent ill-will.

A favorable price quoted by a supplier with a modern cost analysis system means his facilities are especially suitable for that particular work. Once the job is taken on, there will be a minimum of difficulties encountered. Higher prices quoted by other suppliers on the same item may mean that their facilities are not that compatible for the specific job. The higher price does not necessarily mean they are less efficient but rather that they can better be utilized for other types of work.

Finished Weight. Ability to cast close to finished dimensions is another factor to be examined. A foundry's molding practice deserves consideration whether buying on a per piece or per pound basis. There can be a variation of up to five per cent in weight on the same casting due to insufficient ramming or low mold hardness. On heavier castings purchased on a per pound basis, there can be a noticeable difference in billed weight and price. With castings purchased on either a per piece or per pound basis, a bulge due to low mold hardness may occur on a surface to be machined resulting in extra and expensive machining costs.

Delivery. Slow deliveries can cause bottlenecks in the production departments. It is important that a supplier not only quote reasonable delivery but actually live up to his promises. Tardy casting deliveries can also upset a customer's own commitments and possibly result in the loss of orders.

Foundries Offer Technical Aid

Technical Services. A number of foundries offer the help of their metallurgists and engineers as part of their overall service. On development work, this help can result in appreciable savings to some customers. Or perhaps design changes will be suggested which will make the part easier and less expensive to cast. Knotty metallurgical problems slowing down production may be solved with the help of a foundry's technical services. The availability of these services is usually an indication that a foundry has excellent control over its castings, meaning a minimum of difficulty to the customer.

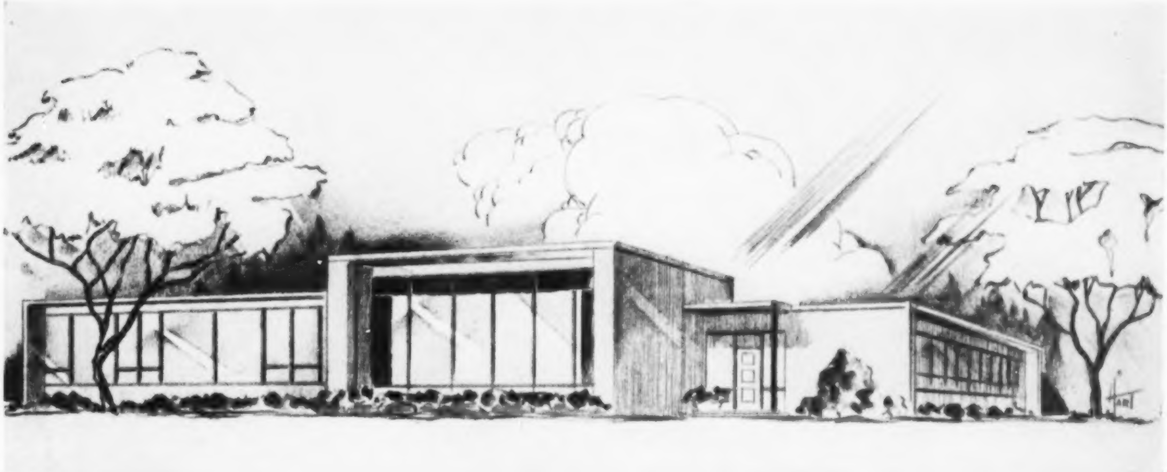
Type of Supplier. Some foundries which offer open capacity utilize their facilities primarily for their own particular product line. Outside work is solicited because production is down and additional tonnage is required to compensate for fixed burden costs. This can be a dangerous and expensive situation for a customer expecting long-range service.

During a period of increased orders and greater need for his own facilities, a supplier may throw out all outside work. This will necessitate seeking another reliable supplier at a time when all capacity is relatively scarce. Also, the customer will have to contend once again with the usually trying period of acclimation which occurs whenever a new pattern is placed in a foundry. Foundries which exist solely on the basis of work solicited from outside sources may offer more stable long-range service.

Initial Price But One Step

After considering these points, it can be determined whether or not the quoted price is indicative of the true price. This initial price is but one step of the overall cost and would be decisive only if immediately upon receipt, the castings were stacked into piles and never again used. This is very seldom true.

The quoted price from several suppliers assumes importance only when all other factors discussed here have been carefully examined and, for all intents and purposes, are similar. If they are not, then the price paid to the supplier for the castings may be extremely misleading. The true cost to the consumer may be more than he thinks!



Proposed new AFS headquarters building to be built at Des Plaines, Ill.

Ground-breaking Near For New AFS Headquarters

THE NEW headquarters building for American Foundrymen's Society has reached the final planning stage. The structure will be erected on Northwest Highway (U.S. 14) at Des Plaines, Illinois, a suburb of Chicago.

As of July 15, final working drawings and specifications for all general construction and mechanical and electrical work had been completed. In most instances, the recommendations of the AFS Building Committee were incorporated into the finished drawings by the architect.

Review and Bids

After the committee has thoroughly reviewed and considered the recommendations, they will be sent out for bid to a group of 10 contractors who have had wide experience in the field of industrial contruction. When the bids are returned, they will then be submitted to the Board of Directors of AFS for final action.

Present progress indicates that the initial ground-breaking ceremonies at the building site should take place approximately September 1. Announcement will be made later for those in the Chicago area who wish to attend. A picture story will cover the event in the October issue of AMERICAN FOUNDRYMAN. As construction on the building continues through the following months, progress will be reported here.

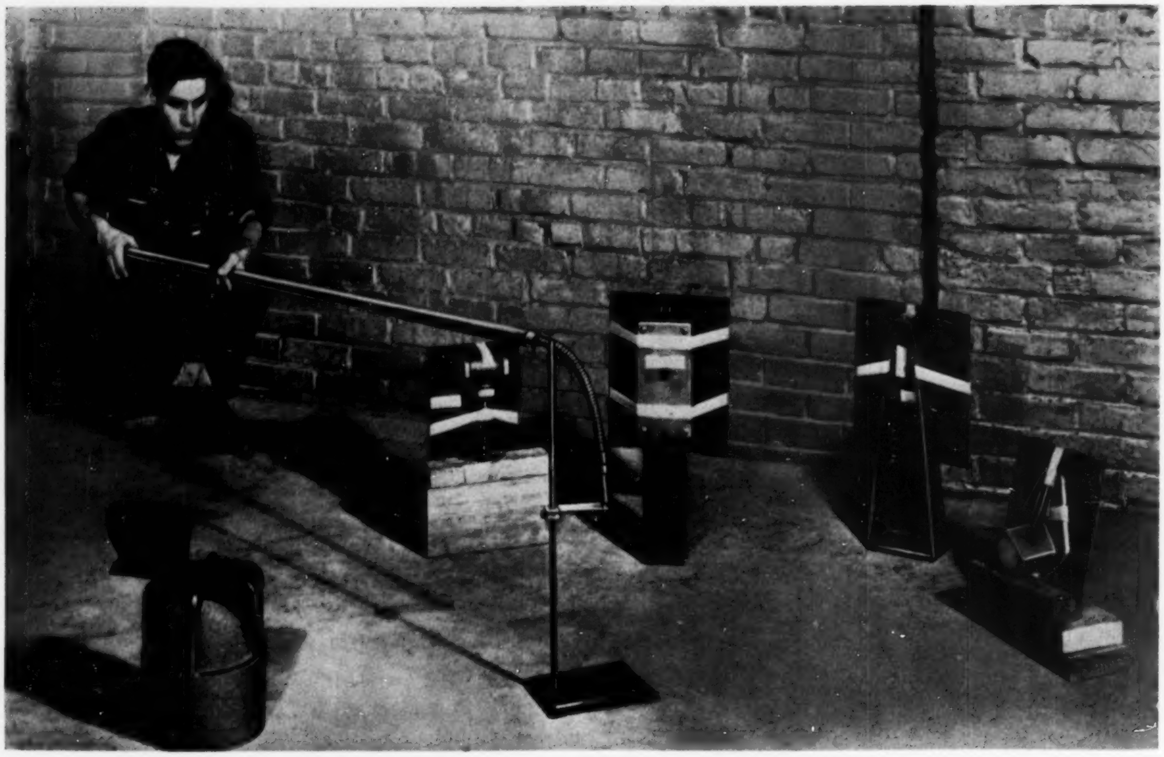
The new building will be of modern design, and will incorporate the latest industrial construction techniques. It will be built of reinforced brick and concrete and will be completely fireproof. Of particular interest to foundrymen will be the heating system, which will be composed completely of cast iron. The system will deliver radiant heat that will circulate evenly throughout the building.

Headquarters Use

All of the many AFS activities will be housed in the new headquarters. The general offices, conference room, library, stock room, and mailing room, will take up most of the floor space.

The library will be unique in the country, probably the only one of its type. In it will be housed all of the valuable technical papers, manuscripts, books and other publications that have been accumulated over the 57-year history of the Society. This collection will be maintained by a full-time librarian and will be available to AFS members and the industry for research or other projects.

Although ground-breaking will take place in September, the process of bid taking, review and award is likely to make predictions of completion of construction rather indefinite. At this time, it is not contemplated that the building will be ready for occupancy until sometime well into 1954. However, the new headquarters will be completed as rapidly as possible.



Radiographer placing cobalt-60 source in position to make radiograph of a value on several castings.

Radiography and Cobalt-60

G. J. Barker / *Prof. of Mining and Metallurgy, Univ. of Wisconsin*

Use of cobalt-60 for industrial radiography warrants a review of precautions necessary in handling sources of radiation. The paper was presented at the AFS Health and Safety Conference held at the University of Wisconsin.

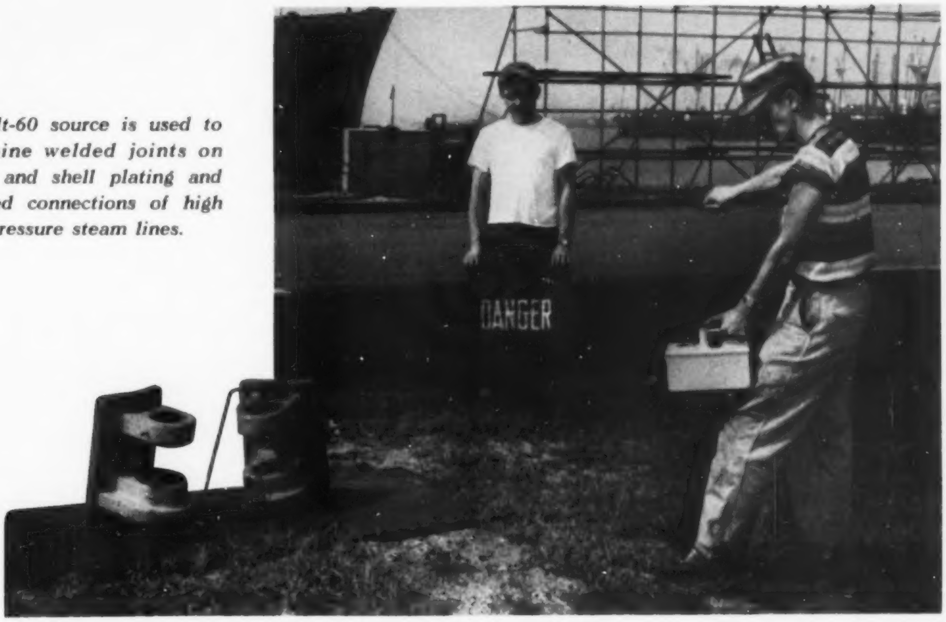
■ Recently, more rigid specifications for foundry castings have created an interest in the use of cobalt-60 for radiographic inspection to determine whether a casting is sound or defective. A new radiographic tool, cobalt-60 is most useful where castings two to six in. thick are to be inspected. However, with proper technique it may be used successfully on steel or iron castings only ½ in. thick. It may also be used for heavy castings up to 12 in. in thickness.

Cobalt-60 is one of the new radioactive isotopes developed under atomic energy research and recently has been made available for use in industry. Radioactivated cobalt is produced from chemically pure cobalt-59 metal by placing it in a neutron flux provided by an atomic reactor or fission pile, such as is operated at Oak Ridge, Tenn. Fast moving neutrons in the reactors are absorbed in the nuclei of the cobalt making the unstable isotope, cobalt-60.

Emits Gamma Rays

When the unstable atom breaks down, it does not emit the neutron, but releases energy in the form of a fast moving beta particle and two gamma rays. A beta particle is simply a high speed electron, the same type of particle which constitutes an electric current when in motion in vast numbers in a conductor. A gamma ray is a discrete bundle or photon of electro-magnetic energy, identical in nature with x-rays, and exhibits exactly the same properties. The difference between x-rays and gamma rays arises in the way they are produced, the x-ray by bombarding the target of an x-ray tube with electric current moving across high voltage, the gamma ray from the unstable atoms of radioactive material.

When produced by machine, x-rays are composed of numerous wave lengths; the shortest wave length is determined by the voltage used in the machine. To produce wave lengths as short as the gamma rays of



Cobalt-60 source is used to examine welded joints on deck and shell plating and welded connections of high pressure steam lines.

cobalt-60, it would be necessary to employ an x-ray unit of approximately two million volts. Gamma rays emitted by the disintegration of radioactive material, such as cobalt-60 or radium, have wave lengths of approximately 0.01 to 1.4 angstrom units. (An angstrom unit is one one-hundred-millionth of a centimeter.)

These short waves, traveling at tremendous speed, have considerable energy and are able to penetrate matter. They also possess the property of affecting a photographic plate or film; the blackness of the emulsion when the film is developed depends on the quantities of rays which strike it. Because various materials have different absorption values, it is possible to make a radiograph of an object. X-rays, radium and cobalt-60 can all be used for radiography.

Cobalt-60 is used increasingly by laboratories whose operations do not warrant large scale expenditures. Like all radioactive material, it decays and loses strength. Radium has a very long half-life, while cobalt-60 decays at a more rapid rate and at the end of 5.3 years is approximately one-half as powerful as it was when new. However, the first cost of the cobalt-60 is so low the loss is not serious.

The energy radiation of cobalt-60 is measured in curies, as are other radioactive materials. (One millicurie is defined as 3.7×10^7 disintegrations of radioactive atoms per second.) The radiation from one millicurie of cobalt-60 is equivalent to 1.6 milligrams of radium.

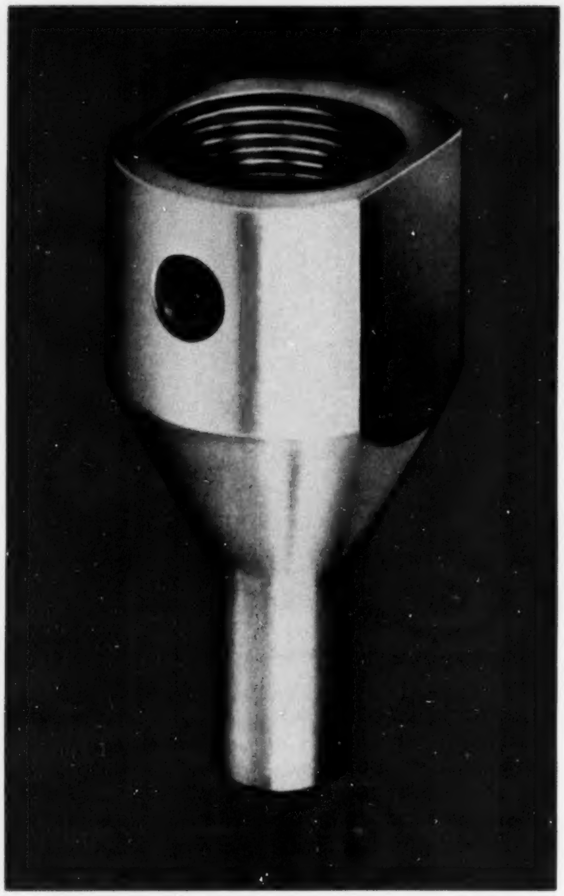
Radiographic Technique

A source of 500 millicuries of cobalt-60 is usually sufficient for most plant operations. Radiographic technique employed is similar to that of radium with some differences such as time of exposure and distance of film to source of radiation. This technique can be learned easily by one familiar with radiographic inspection.

When using x-rays, radium or cobalt-60, all personnel must be protected against radiation hazards. Radiation is measured by the amount of ionization it produces in air. The roentgen or milliroentgen is the unit of measurement most commonly used. Radiation emitted by cobalt-60 must be controlled carefully, because when a person receives too large an amount of this radiation, his physical health may be seriously impaired.

While radiation is dangerous, it need not be feared, but it certainly must be respected. Radiation may cause serious biological effects in humans because ionization is produced in the flesh, which is harmful to living organisms in too large doses. It causes a decrease in the white corpuscles in the blood and may damage permanently any of the glands, tissues or other organs of the body if the dose is too heavy. A dose whose tolerance the human body can accept has been set by the Atomic Energy Commission, and has been placed low enough so that no permanent harmful injury should result. The tolerance dose now generally accepted is 300 milliroentgens per week. This is figured on a 6-day week, and it is general practice to hold daily radiation doses to less than 50 milliroentgens per day. For an 8-hour day rate would be slightly in excess of 6 milliroentgens per hour.

It is important that personnel working with radioactive material not be subjected to radiation at a rate of more than 6 mr per hour. Heavy dosages that might be sustained in a moment or two of exposure are to be avoided. For that reason, adequate caution must be taken in handling cobalt-60. Under no circumstances should an employee touch the material with his hands. Because radiation decreases inversely as the square of the distance increases, it is desirable to remain as far away from the source as possible when it is being used for radiography. A handling tool approximately 6 feet in length should be used in placing



Cobalt-60 radiography source, enlarged 6-times.

the capsule of cobalt-60 when making an exposure.

Personnel should be continuously monitored for exposure, as a safety precaution. One means of monitoring is to insist that the personnel, while working, always wear a film badge which should be developed weekly. A reliable company servicing the film badge will keep a permanent record of the exposure for the particular person. This insures a constant check on the safety of the employee and may prevent an expensive lawsuit later. The effect of radiation does not show up immediately and if a person is careless he may be severely injured without realizing it at the time.

Exposure Quantity

While the film badge service will give you a record of the total exposure for a week, it does not indicate the quantity of exposure for any given time during the week. For more complete protection, the employee should also wear a pocket dosemeter. This device enables him to read doses received during any one hour of a working period. By looking at the dosemeter, the employee can tell immediately if he has been overexposed. The pocket dosemeter does not provide a permanent record but is essential for safety in daily work. It can be reset at any time by using a dosemeter charger.

In setting up an exposure for radiography, adequate protective areas in the plant should be provided. A lead-lined room is desirable. However, the initial cost of lead required to provide adequate protection may be prohibitive when large quantities of radiation are used. Concrete walls may be substituted for lead, providing adequate thickness of the wall is provided. If the concrete is made with admixtures of iron filings or turnings, the effective absorption of the walls is greatly increased. Adequate warning signs should be placed around the area when exposures are made. These should be taken down immediately after exposure so that personnel in the plant realize the signs are in position only when there is danger of exposure.

A radiographer using a tool which allows him to approach no closer than 6 feet to a 500 millicurie source could make 150 exposures per week, providing he took a total of only 30 seconds for setting up and removing the source for each exposure. If, however, he should remain at a distance of 6 feet from the exposed source continuously for about an hour, he would receive his maximum allowable dose. Over-exposure to radiation will cause the person exposed to become tired because of the decrease in the white corpuscles in the blood. The best cure for this condition is to remain away from radiation sources entirely for several weeks and absorb as much sunshine as possible.

Max Kuniansky Dies Suddenly at 54

Max Kuniansky, 54, executive vice-president and general manager of Lynchburg Foundry Co., Lynchburg, Va., died at his home on the evening of July 21, following a sudden series of heart attacks. He had spent the day in the plant, where he had been active in his administrative duties since July 1, following recovery from a heart attack on May 21.

A Past President of American Foundrymen's Society, 1947-48, Mr. Kuniansky was a foundry industry leader known for his technical knowledge and his willingness to adopt or develop advanced methods of production. He gave freely of his time and experience to the foundry industry by actively participating in technical and trade groups active in the metals casting field.

He was also a former National Director of AFS, which he joined in 1921, and had served on many technical committees. His various contributions were recognized in 1941 when he was awarded the William H. McFadden Gold Medal.

Mr. Kuniansky was born in Russia but came to this country early and graduated from Georgia Tech in 1919. After four years with various firms, he became associated with Lynchburg Foundry Co. as chief chemist in 1923. He had been with the firm since that date, serving in various capacities until his final promotion in July, 1951.

Exhibits Committee Sets Plans For 1954 AFS Convention

MEETING at the Hotel Sherman in Chicago on July 14, the 1954 Exhibits Committee of American Foundrymen's Society formulated and finalized plans for next year's Annual Foundry Congress and Show. This 58th Convention of AFS will be held in Cleveland's Public Auditorium during the week of May 8-12, 1954.

With Collins L. Carter, new President of American Foundrymen's Society, presiding over the meeting, the committee made decisions regarding the physical operation of the foundry exhibit, which now ranks among the top industrial displays in the nation. Floor plans and actual details for participation in the show will be released as soon as they are approved for publication, probably about the first week in November, 1953.

Members of the Exhibits Committee who attended the session included the following: AFS President C. L. Carter, Chairman, Albion Malleable Iron Co., Albion, Mich.; AFS Vice-President F. J. Dost, Sterling Foundry Co., Wellington, Ohio; AFS Secretary-Treasurer W. W. Maloney; AFS Convention and Exhibits Manager, A. A. Hilbron. Claude B. Schneible, president, Claude B. Schneible Co., Detroit, and president, Foundry Equipment Manufacturers' Assn., was present as an observer, as was A. J. Tuscany Jr., Cleveland.

Official F.E.M.A. representatives at the meeting were: L. L. Andrus, American Wheelabrator & Eqpt. Co., Mishawaka, Ind.; L. H. Heyl, Federal Foundry Supply Co., Cleveland (also representing F.F.M.A.); Thomas Kaveny, Jr., Herman Pneumatic Machine Co., Pittsburgh, Pa.; C. V. Nass, Beardsley & Piper Div., Chicago; and H. J. Niemann, Hydro-Blast Corp., Chicago. F. B. Flynn, S. Obermayer Co., Chicago, was the second F.F.M.A. representative present.

Other exhibitor representatives included: C. A. Sanders, American Colloid Co., Chicago; J. A. Gitzen, Delta Oil Prods. Co., Milwaukee; F. A. Pampel, Chain Belt Co., Milwaukee; E. F. Kindt, Kindt-Collins Co., Cleveland; and R. L. McIlvaine, National Engineering Co., Chicago.

In addition to planning for the 1954 Exhibit, the technical session program for the Convention is taking shape under the guidance of Hans J. Heine, new AFS Assistant Technical Director. A well-balanced series of technical meetings is being prepared.

Steel Casting Design— A Story in Pictures

■ Good casting design—a major step forward in any market development campaign or program for better utilization of castings—has received considerable impetus from the work of such men as W. T. Bean, Jr., consultant, and Frank G. Tatnall, Baldwin-Lima-Hamilton Corp., Philadelphia, who advocate and use experimental stress analysis. The modern technique is demonstrated in this series of photographs made by Superior Steel & Malleable Casting Co., Benton Harbor, Mich.

In this case history of the development of a compressor crankshaft casting, the design starts with a free hand sketch. A quick computation indicates whether the design is essentially sound. Then critical sections are modeled in wood and clay to achieve best shape for mechanical properties, soundness, and castability.

Abrupt cross sections are avoided through detail drawings which aim to bring out uniform cross sections and surface-mass ratios. Object is to achieve good flow and cooling rates. Sample castings produced are checked by x-rays and by measurement for weight and dimensional accuracy.

Finally the casting is machined and put through simulated service tests. These start with the application of a coating of brittle lacquer which cracks to indicate concentrations of stress when the casting deforms under service loads. Assembled in a compressor, the crank-shaft is put through its paces, then examined to determine the location and direction of the crack patterns in the brittle lacquer.

Where severe stress patterns have developed, SR-4 strain gauges are applied so maximum principal tensile strains can be measured under simulated service loads. Stress concentrations can then be eliminated by removing metal or by redistributing it.

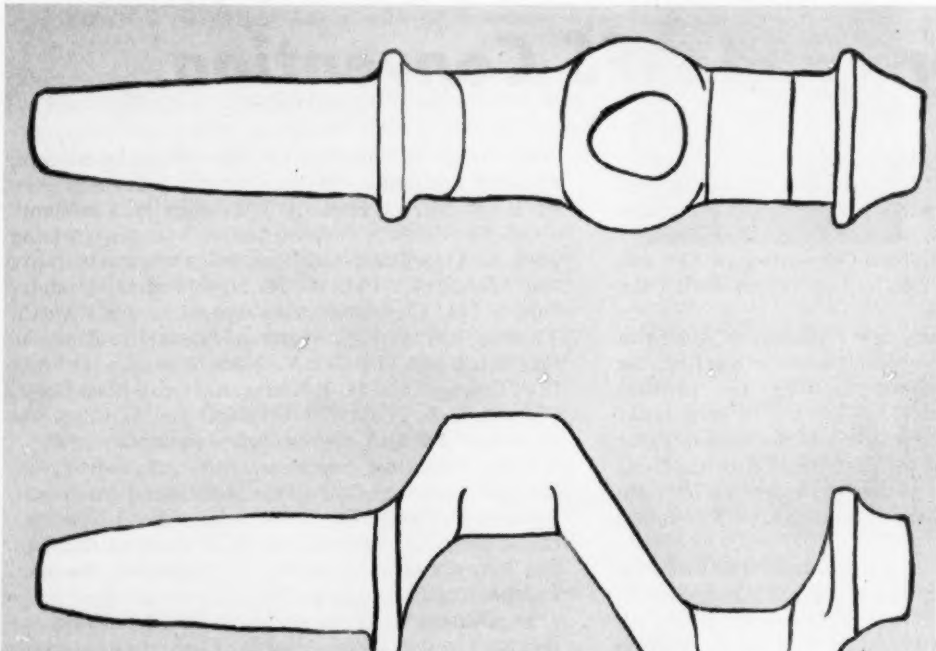


Fig. 1 — First step is to make free hand sketches of casting.

Fig. 2 — Next, wood-clay models are fabricated.

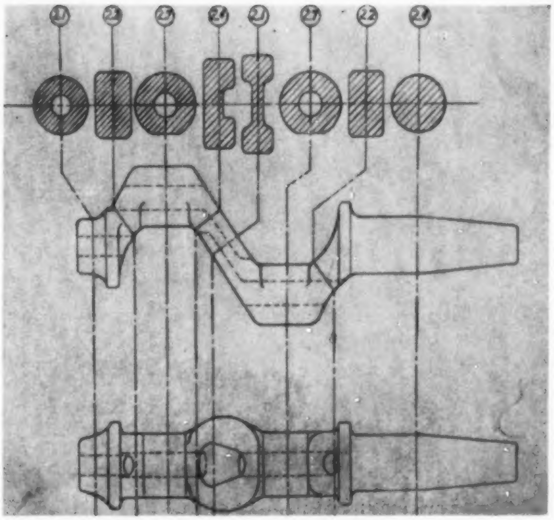


Fig. 3 (above) — Avoid abrupt changes in sections.

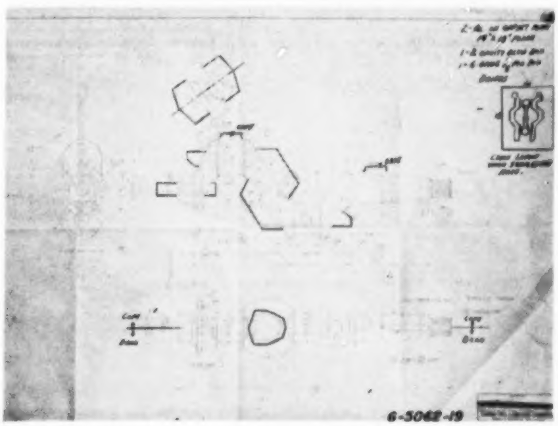
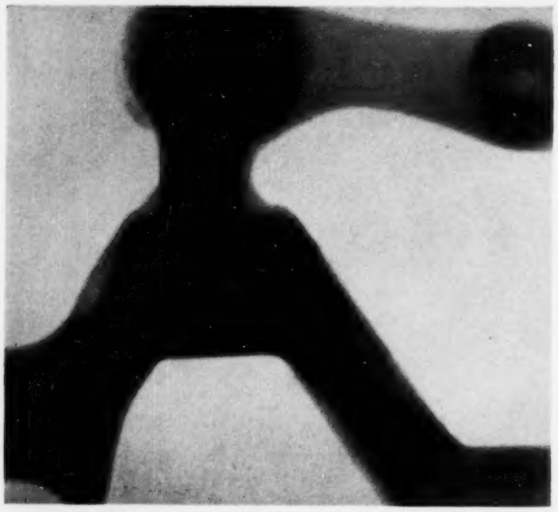


Fig. 5 (above) — Make pattern equipment.

Fig. 4 (left) — Make pattern layout.



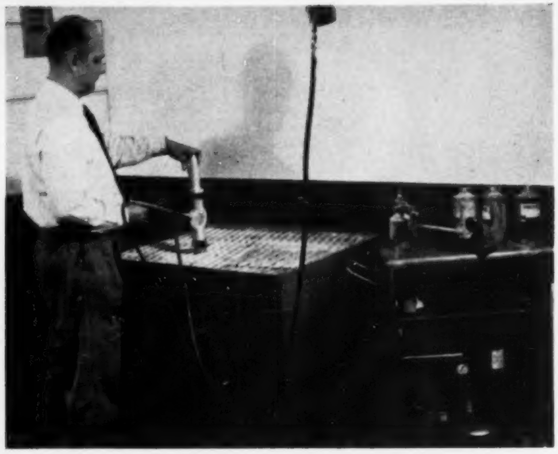


Fig. 7 (above) — Apply brittle lacquer.

Fig. 6 (left above) — X-ray sample castings.

Fig. 8 (left) — Apply simulated service loads.

Fig. 9 (below) — Locate areas of stress concentration.

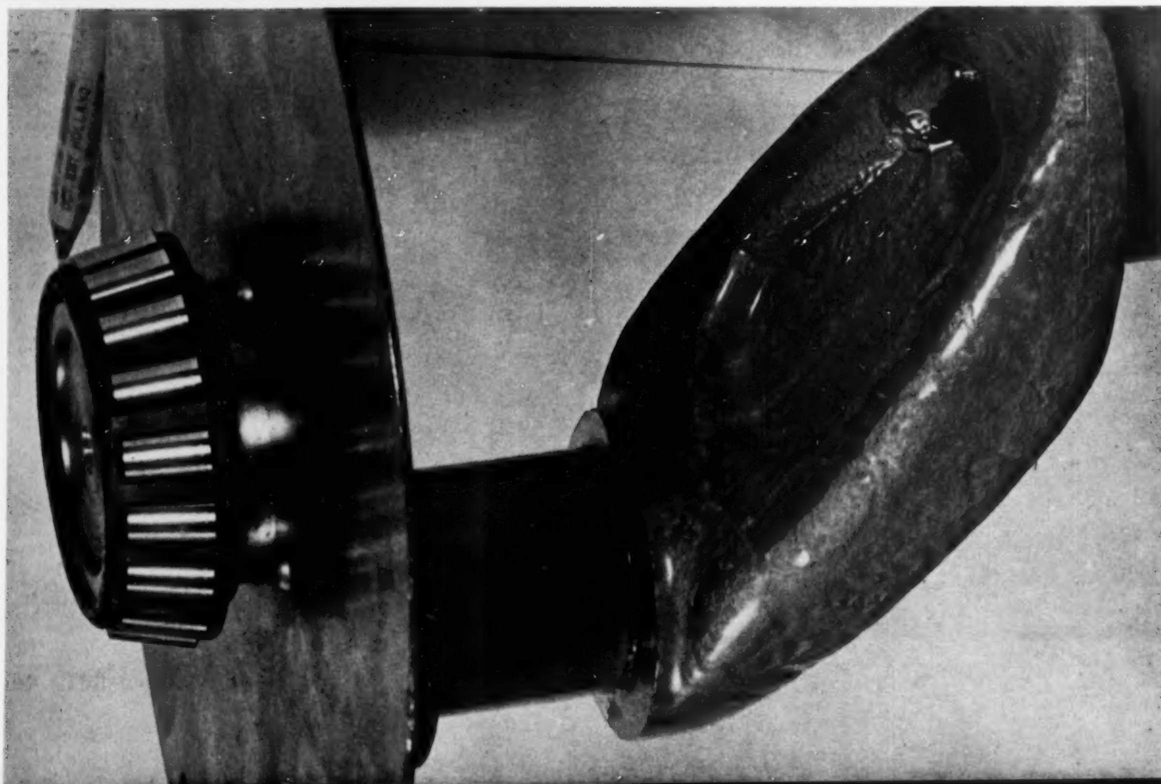


Fig. 10 — Measure strains with SR-4 gauges.

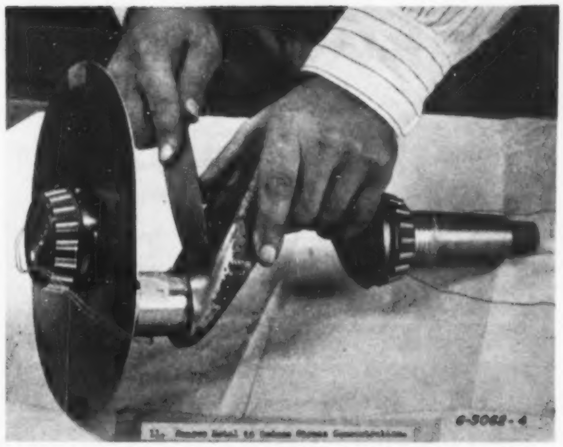


Fig. 11 — Remove metal to reduce stress concentration.

Fig. 12 — Redistribute metal to reduce stress concentration.

Fig. 13 (right) — Release for production after "Measure-Modify-Measure" program is complete.

Critical Analysis of Entries In 1953 Apprentice Contest

Roy W. Schroeder / *Asst. Prof., University of Illinois (Navy Pier)*

■ Many questions must have gone through the minds of the young artisans who competed in the 1953 A.F.S. Apprentice Contest, as they received their instructions for the competition—to core or not to core . . . to riser or not to riser . . . to chill or not to chill . . . to split or make the pattern solid. These and many others confronted the judges, too, as they sought to pick the winners.

During this years' A.F.S. Convention, the foundrymen who examined the entries on display had many differences of opinion as to the proper pattern construction or molding technique. Apprentices . . . judges . . . foundrymen . . . all must have wondered whether there is one best way to make a casting or a pattern.

As usual, the 1953 entries considered in the final judging represented good, and in some cases questionable or bad, practice. A discussion of the winners and some of the losers should help entrants in the 1954 contest and help 1953 losers learn where they erred.

First and second place metal pattern winners (left and right, Fig. 1) are shown with a loser (center) which is 3/16 in. higher than it should be. All core boxes submitted from the same locality had the same mistake. No points were deducted if the apprentice ran into a porous condition in the casting and had to repair it.

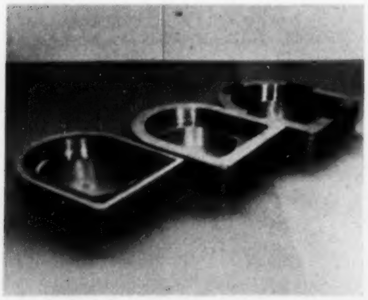
So far, the metal pattern division of the contest has been confined to working to close tolerances, there being only one possible way of making the pattern. This made construction—and judging—comparatively easy. The 1954 competition for metal patternmakers promises to be more difficult.

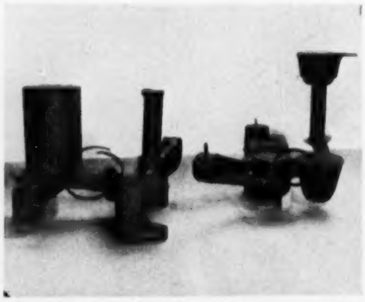
May Mean the Difference

The amount of metal melted and poured to produce a given casting may mean the difference between profitable operation and a loss. Oftentimes risers are placed in positions that really are the seat of trouble, not only adding to the over-all cost of the casting but causing it to be defective. Figure 2 shows two examples of how not to riser castings. On the left is a casting gated through the riser using a skim arrangement in the runner. Of what use is a 3½-in. riser when the feeding neck is approximately 2 x 2-in.? The connecting channel supposed to feed the heavy boss will freeze before the casting and the riser, thus adding to expenses and defeating the purpose the riser is intended to serve. A slight shrink is also noticeable at the base of the 1¼-in. top riser—here a larger fillet should have been made. Also the riser is too small for the heavy section and the adjoining boss. Another poor example of risering is shown at the right in Fig. 2 where the thin narrow section connects the casting and the inverted shrink bob. Evidence of slag or dirt inclusion is shown in the circled part of the casting. It is doubtful if the small whistler vents on the top of the two bosses would compensate for the shrinkage in these heavy sections. Some veining is apparent at the base of the boss on the top section of the casting.

Poor yield—gates too heavy and a useless riser—is apparent in Fig. 3 (left). The size and construction of the gate would be sufficient to pour a casting of several hundred pounds, while the narrow neck attached to the excessively high riser would certainly freeze before the casting or the riser. A lower cope with a heavier riser close to the casting would be more economical both in yield and molding time.

The casting at the right in Fig. 3 shows evidence of poor facing, soft ramming, and a poor parting surface.





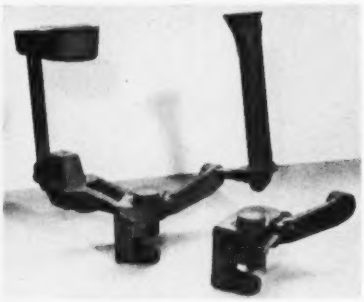


Fig. 1 (left)—First and second place metal pattern winners (left and right), shown with non-placing entry (center), which is 3/16-in. too high. Fig. 2 (center)—Risers are often placed in positions that add to over-all cost of castings and cause defects, as shown. Fig. 3 (right)—Gates too heavy, useless riser (left). At right, evidence of ramming and poor parting surface. Cleaning cost would be too high, because of metal penetration and the presence of fins.

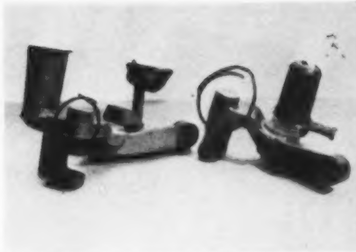


Fig. 4 (left)—Excellent casting surface; absence of fins shows good melting. Fig. 5 (center)—Here are two more good castings, resulting from good facing. Fig. 6 (at right)—Failure to fillet riser (left) has caused severe draw (circled) at junction of riser and casting. (Right) This casting was apparently poured directly into the riser through bottom-pour ladle.

Metal penetration and fins would increase cleaning cost.

Apprentices planning on entering the 1954 A.F.S. Apprentice Contest will benefit by studying the castings shown in Fig. 4. Casting surface is excellent, showing the use of a proper sand. Absence of fins indicates good molding practice, and there are no indications of metal penetration which shows proper ramming. Gates were choked properly before entering the risers, while the necks joining riser to casting would insure a sound casting by proper feeding. Cope heights were not excessive, giving economy in mold construction.

Apprentices who made these, and their management, are to be congratulated on a good training program with the apprentices being well grounded in fundamentals. Such well-trained apprentices assure good mechanics and efficient supervisors in the future. These are the primary objectives of the AFS Apprentice Contest, which has contributed materially to the industry since its inception some years ago.

Fig. 7 (left)—This prize winner has a well-necked riser, shows fine commercial casting quality. Fig. 8 (right)—Poor sand condition is shown here by veining and penetration of metal. Cutting and parting are poor.

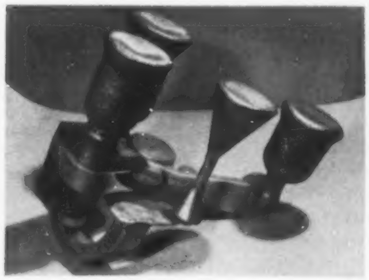


Fig. 9 (left)—Non-ferrous first prize winner, which was made with data from AFS "Fluid Flow" motion picture. Fig. 10 (right)—Another non-ferrous entry.

Good Facing Used

Two more good castings are shown in Fig. 5. It is apparent from the casting surface that a good facing was used. Gating through the riser with a choke in the runner insured clean metal and a sound boss. No attempt was made in either case to feed the heavier section of the casting (circled). Few of the apprentices took into consideration the feeding of the heavy section with the added problem of insuring sound metal in the boss extending above the remainder of the casting.

In Fig. 6, risers are ample but failure of the apprentice making the casting at the left to fillet the riser has caused a severe draw (circled) to take place at the junction of the riser and casting. Molding cost would be increased by the use of the excessively high cope. Yield on this casting was low, 58½ lb of steel having been poured for this 12-lb casting. This compares with 24¼ lb poured into the prize winner (Fig. 7). A well necked riser, external chills, and a carbon rod in the blind riser resulted in a fine commercial casting.

At the right in Fig. 6, is a casting apparently poured directly into one of the risers—probably through a bottom-pour ladle. Cleaning time would be high because of the large risers completely covering the heavy sections and because of metal penetration as shown within the encircled portions. This was caused by soft ramming, poor facing or a combination of both.

Figure 8 indicates a poor sand condition as shown by the veining and metal penetration. Improvement could also be made in the cutting of the parting. Question: How would you keep the small neck on the casting at the right fluid long enough to feed the heavy boss from the riser?

The non-ferrous entry in Fig. 9 used information from the AFS Fluid Flow movies to take first prize in that division. Casting surface, absence of fins, and freedom from defects show good molding technique. Only recommendation here would be to cut down on distance metal must travel and to further reduce the neck joining the risers to the casting. Figures 10 and 11 show two more non-ferrous entries. In the latter the length of the runner should be reduced, and a crush or poor job of patching is evident.

The wood pattern section, as always, showed freedom of imagination in construction. Material used ranged from white pine to mahogany and black walnut. Construction ran from a one-piece pattern and a single core box to multiple part patterns and core boxes of four or more parts. Time for making

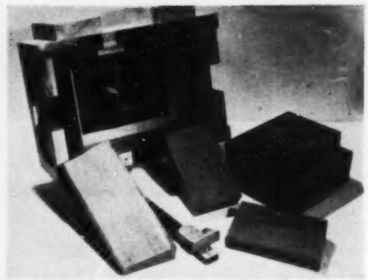
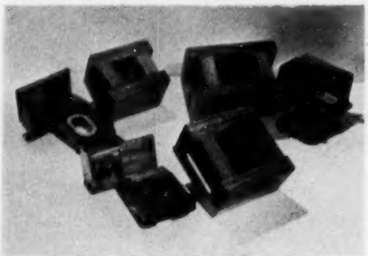
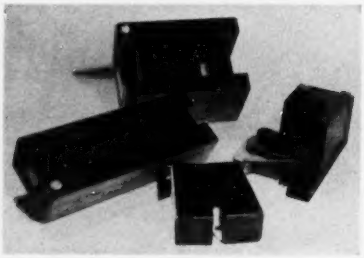


Fig. 11 (left)—The runner is too long in this non-ferrous casting, which shows poor patching. Fig. 12 (center)—This is the wood prize winner. Corner fillets make working and cleaning easier. Fig. 13 (right)—Here is a good example of complicated planning. Cover core was used in producing this casting. High cost for low production run.





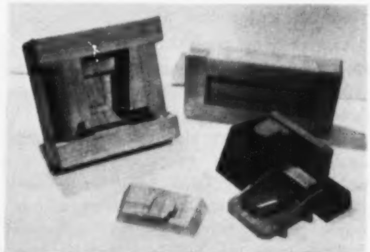


Fig. 14 (left)—Irregular parting cut core cost, but increased molding cost. Fig. 15 (center)—three separate cores would add to core and molding cost. Fig. 16 (right)—Large block core, with portion of boss made in core, rest in green sand.

the patterns ranged from 11 to 36 hours. In most cases corners were filleted and parting lines were well established.

The majority of apprentices favored a green sand core for the oblong opening, while those who used a dry sand core had the core kiss through. The prize winner (Fig. 12) ran fillets in all corners. This would make it much easier for the coremaker and molder to make the job and give cleaner castings. The one-piece core box had plenty of draft which makes it easy to draw the box and to set the core.

Fig. 13 shows an entry using a cover core and gives a good example of complicated thinking. Apprentices would do well to compare Fig. 12 and 13. The cost of the latter could hardly be justified for making 25 castings.

Increased Molding Cost

Patterns shown in Fig. 14 have cut core cost but by so doing have increased molding cost due to the establishing of an irregular parting. The loose piece held in place by the pin (left foreground), unless dovetailed or seated in some manner, would call for care in molding if the lug in question was to be square with the casting. The sharp corners on the core in the left background make it more difficult to make the core and set it without shaving. Increased core cost is apparent in Fig. 15. Making and setting the three separate cores would definitely add to the core and molding cost without improving casting finish or cutting cleaning cost.

Some of the patterns submitted followed the general construction shown in Fig. 16. The large block core, with a portion of the boss being made in the core and the rest in green sand, would add to cleaning cost and call for a hand operation to remove the fin which would result.

The AFS Apprentice Contest Committee, which conducted the competition, is composed of the following: *chairman,* Roy W. Schroeder, Univ. of Illinois, Navy Pier Branch, Chicago; *vice-chairman,* G. E. Garvey, City Pattern & Foundry Co., South Bend, Ind.; *secretary,* J. E. Foster, AFS Headquarters, Chicago; F. W. Burgdorfer, Missouri Pattern Works, St. Louis; Ralph Lightcap, Rupp Pattern Co., Rockford, Ill.; E. J. McAfee, Puget Sound Naval Shipyard, Bremerton, Wash.; Vaughan C. Reid, City Pattern Foundry & Mach. Co., Detroit; G. Ewing Tait, Dominion Engr. Works, Ltd., Montreal; and J. J. Thompson, Fletcher Works, Inc., Philadelphia.

Judges for the Apprentice Contest were: *Steel:* Edward Gricus, Link-Belt Co., Chicago; A. DiGirolamo, Chicago Steel Foundry Co., Chicago; and Sam Belus, Burnside Steel Foundry Co., Chicago. *Metal Patternmaking:* Joseph J. Schallerer, Calumet Pattern Works, Chicago; H. K. Swanson, Swanson Pattern & Model Works, Chicago; and James Makuta, Mfrs. Brass Foundry Co., Chicago. *Wood Patternmaking:* H. K. Swanson; A. Cervenka, Jr., A.B.C. Pattern & Foundry Co., Chicago; and James Makuta. *Gray Iron Molding:* A. C. Den Breejen, Nicol-Straight Foundry, Chicago; Cornell G. Mate, Greenlee Foundry Co., Cicero, Ill.; Robert Hendry, Love Bros., Inc., Aurora, Ill.; and Joseph M. Artz, T. L. Artz Foundry Co., Chicago. *Non-Ferrous Molding:* Fred L. Riddell, H. Kramer & Co., Chicago; Joseph A. Mulvey, Crane Co., Chicago; and Marshall D. King, Hills-McCanna Co., Chicago.

Special acknowledgements are extended to the following firms and individuals for assistance with the 1953 Contest:

Metal Patternmaking: Aluminum for metal pattern castings supplied by F. W. Burgdorfer, President, Missouri Pattern Works, Inc., St. Louis. The aluminum castings were made by Ace Pattern, St. Louis, from metal supplied by the Missouri Works.

Wood Patternmaking: Model and pattern to prove accuracy of drawing, by E. J. McAfee, Puget Sound Naval Shipyard.

Molding Divisions: Aluminum patterns made by Scientific Cast Products Co., Chicago.

Pattern castings were finished by City Pattern Foundry Co., South Bend, Ind., through the courtesy of G. E. Garvey.

Shipping boxes for the patterns were made by Beardsley & Piper Div., Pettibone and Mulliken Corp., Chicago, courtesy of C. V. Nass.

Foundries Involved In New State Legislation

Workmen's Compensation Claims

In recent months several state labor departments have been conducting surveys of various industries in order to chart legislation on workmen's compensation. The primary purpose has been to raise the rates of compensation, including those for the foundry industry.

A rate increase in compensation is in keeping with the continuing trend toward higher living costs and higher cost of operation. The only effective method to reduce the workmen's compensation cost is by preventing accidents and injuries to employees in the industry.

The U. S. Department of Labor has just released the accident frequency rates for the first quarter of 1953 in the foundry industry. Here are the available statistics:

	Average for First Quarter of 1953	Annual Average 1952
Gray iron and malleable foundries	**28.6**	**31.7**
Steel foundries	**22.5**	**25.3**
Non-ferrous foundries	**21.1**	**21.9**

It should be noted that the frequency rate for the first quarter of this year is slightly below that for the year 1952. If this trend continues, fewer employees will be injured in the foundry industry this year than in 1952. This is a very good indication. Let's continue to reduce the accident frequency rate until it compares favorably with other industries, which have a cumulative rate of 12.5. Workmen's compensation rates and costs will be proportionately less as we succeed in preventing our foundry employees from being injured by preventable accidents.

Air Pollution Legislation

Several states and municipalities are in the process of revising present smoke abatement codes. Some states are attempting to adopt such legislation on a state-wide basis. It is to the foundry's advantage to eliminate the smoke nuisance before such legislation is adopted. After the statutes are modified, the cost of equipment to comply with such laws may be prohibitive.

Foundry Illumination

The Illuminating Engineering Society, in cooperation with a representative group of foundrymen, has produced a guide for recommended lighting practice in the foundry. This committee conducted field tests over the past seven years, covering each phase of foundry operation. The foundry areas requiring artificial illumination have been listed, together with recommendations for each specific area and task. This guide, entitled "Lighting For Foundries," may be obtained for 50 cents from American Foundrymen's Society, 616 So. Michigan Ave., Chicago 5, Ill.

Helen Dudek, of the AFS headquarters staff, models a new protective coat and arm shield at the SH & AP booth during the 1953 Convention. Watching are W. J. Smale, (seated) Michigan Mutual Liability Insurance Co., Detroit; Robert Gidel, National Safety Council, and W. N. Davis, Director of Safety, Hygiene and Air Pollution of AFS.

Noise a Threat

The states of New Jersey, Wisconsin, New York and Indiana are now accepting and hearing claims under the Workmen's Compensation Act for loss of hearing. The foundry industry can expect claims of this type to multiply as test cases are resolved in the various state courts. The Safety, Hygiene and Air Pollution Committee members of AFS will be pleased to supply you with information and assistance in solving your industrial noise problems.

Understanding Melt Quality

J. G. Kura / *Battelle Memorial Inst., Columbus, Ohio*

Acceptable castings are those which meet service requirements. Maximum serviceability calls for high-quality melts. The author discusses melt quality and effect of mold materials on molten metal, and gives a simplified outline of the theory of gases in copper-base alloys.

▪ What is melt quality and how can it be measured? It refers to the quality of the liquid metal and is governed not only by the content of alloying elements, as determined by ordinary chemical or spectrographic analysis, but also by the amount of gases in solution in the liquid metal. Unfortunately, there are no suitable methods available for the quantitative determination of dissolved gases in copper-base alloys. Therefore, indirect methods, such as the determination of the mechanical properties and examination of the characteristics of the fracture in a test casting, are usually employed to measure qualitatively the amount of gases that were present in the melt. X-ray examination and density determinations are also useful tests for evaluating melt quality. In all of these tests, the objective is to reveal the presence of microporosity, the defect resulting from the evolution of gas during solidification of the casting.

Thus, melt quality becomes synonymous with gas content, and the quality of the melt is judged by one or more tests which reveal how much microporosity is present in a casting.

What Microporosity Does to Casting

The illustrations show typical defects caused by gas evolution in 85-5-5-5 alloy. Figure 1 is a radiograph of a cylinder* cast at 2210 F in a coated-sand mold prepared with silica sand and a commercial plastic-carbon resin. All of the castings were machined inside and outside and the final wall thickness was ¼ inch. The melt was prepared under a glass cover in an induction furnace and there was no opportunity for

*Film was placed inside the cylinder which was masked with lead on the outside so segments of the cylinder were exposed to the x-ray beam. The vertical, dark bands result from overlapping of successive exposures.

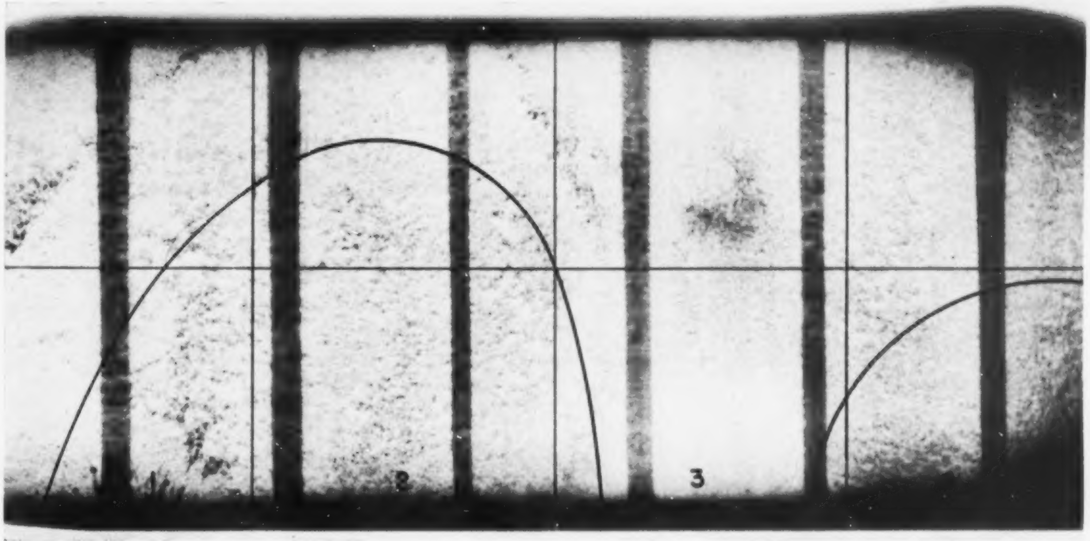


Fig. 1—Radiograph of cylinder cast in coated-sand mold at 2210 F from low quality melt. This casting had density of 8.06 grams per cc, and leaked at 5 psi in the areas indicated by the curved markings.

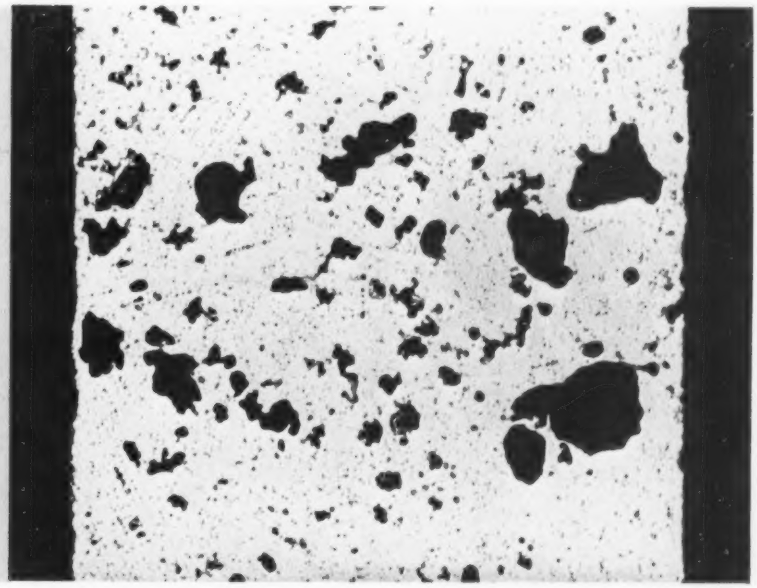
the melt to become oxidized. The poor quality of the melt is reflected by the presence of a large quantity of coarse microporosity which caused leakage to occur at a pressure of 5 psi. A photomicrograph at 20 magnification of a section where leakage occurred is shown in Fig. 2. Note that the porosity borders on the pinhole type.

The radiograph in Fig. 3 is of a cylinder cast in the same mold material, coated sand, as was the previous cylinder. The pouring temperature was also high, 2240 F. However, the melt was prepared under oxidizing conditions in an induction furnace. Some unsoundness is present in the top portion of Quadrants 3 and 4. An area of shrinkage is evident, but leakage did not occur in this casting when tested to a pressure of 1300 psi. A photomicrograph of a section from the porous area in the top of Quadrant 3 is presented in Fig. 4. It shows the presence of rounded gasholes which appear to be a result typical of gases picked up from coated-sand molds. It should be noted that although the gasholes in this instance are relatively large, they were not interconnected and, therefore, the casting was pressure tight.

Gas Due to Moisture

Figure 5 shows a cylinder cast at a moderately high temperature, 2165 F, in a natural green sand mold. This 85-5-5-5 alloy melt was prepared under oxidizing conditions in an induction furnace. Fairly heavy microporosity is evident in the region of the gate (bottom

Fig. 2—Photomicrograph of a leaky section in the lower portion of Quadrant 1 in Fig. 1.



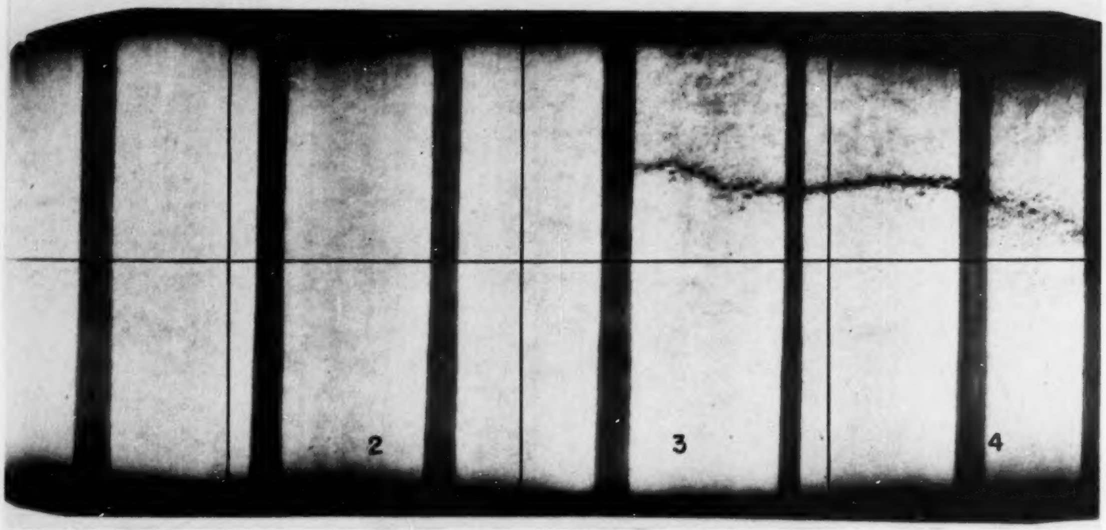


Fig. 3—Radiograph of cylinder cast in coated-sand mold at 2240 F from high quality melt. This casting had density of 8.72 grams per cc, and withstood pressure of 1300 psi despite shrinkage (dark stringer).

portion of Quadrants 3 and 4) and leakage occurred here at a pressure of 25 psi. The photomicrograph in Fig. 6 shows the angular, interconnecting type of microporosity present in the leaky area. Although a good melting practice was employed, some gas was picked up from the moisture in the green sand mold. Because the 85-5-5-5 alloy has a wide solidification range, the area at the gate could not be fed readily. Therefore, the cause of microporosity in this instance is probably shrinkage accentuated by gas evolution. The evolved gas originated from the mold reaction.

The photographs in Fig. 7 and 8 reveal what may occur when mold reaction is not a factor. The cylinder shown in Fig. 7 was cast at a high temperature, 2270 F, in a baked calcined-clay mold. The melt was prepared under an oxidizing atmosphere in a gas-fired furnace. A small amount of microporosity is present in the region of the gate (bottom portion of Quadrant 1); otherwise, the casting is relatively sound.

In spite of the high density of this casting, one leak occurred at low pressure in the region of the gate. The cause of leakage was the elongated microporosity shown in the photomicrograph in Fig. 8. Probably inadequate feeding was the cause of this elongated microporosity which borders on a shrinkage type of defect. This appears to be the case because the melt was prepared under oxidizing conditions to produce low gas content, and because the calcined-clay mold imparts no gas to the melt during casting. This mold is considered to be inert because it was baked at 1600 F

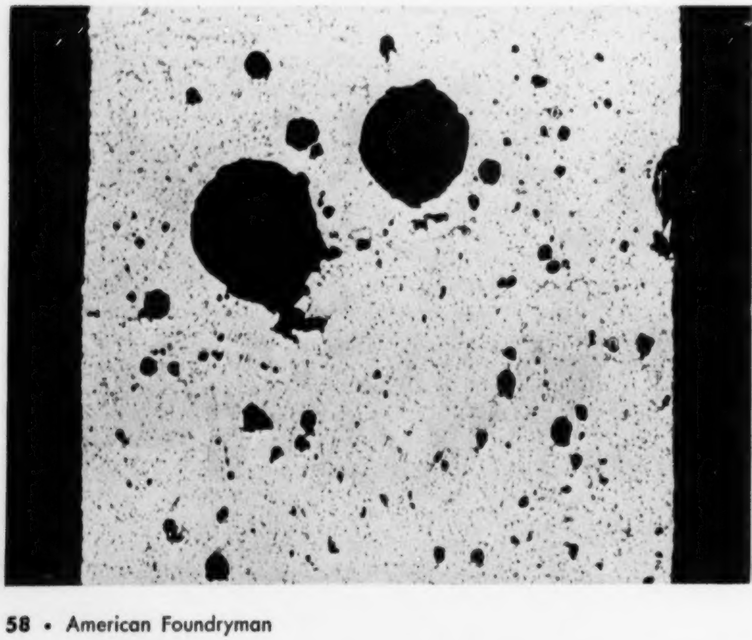


Fig. 4—Photomicrograph of a section from the upper portion of Quadrant 3 as shown in Fig. 3.

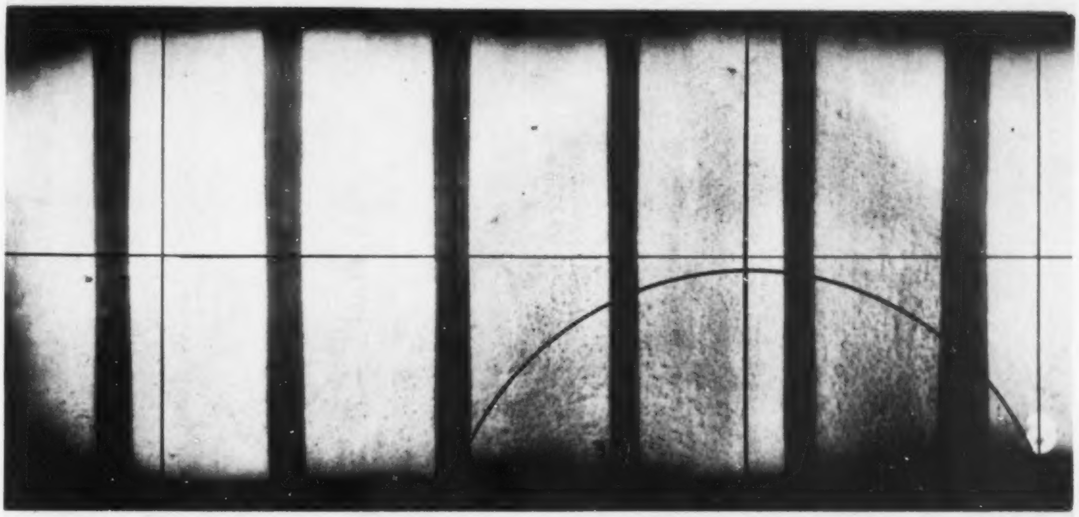


Fig. 5—Radiograph of cylinder cast in natural green sand at 2165 F from high quality melt. Density of casting was 8.68 grams per cc, and leakage occurred at 25 psi in the area enclosed in curved line.

to liberate even the chemically combined moisture.

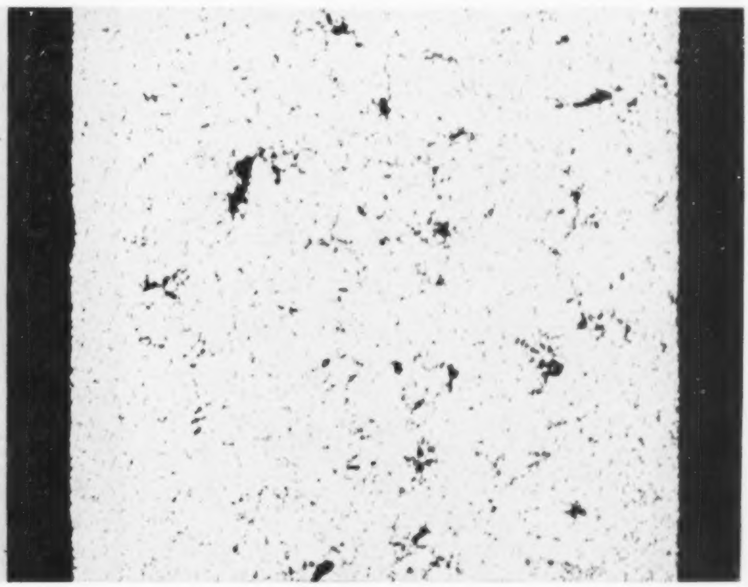
The purpose of presenting radiographs and photomicrographs of this series of castings was to reveal that the method of melting as well as the mold material will affect the gas content of the melt, as evidenced by the microporosity present in a casting. Pouring temperature will also affect the amount of gas picked up from a mold. The effects of all three of these factors, melting practice, mold material, and pouring temperature, are summarized in Fig. 9 and 10.

Melting Practice and Mold Reaction

All of the melts represented in Fig. 9 and 10 were prepared in an induction furnace and were deoxidized with 2 oz of 15 per cent phosphor-copper per 100 lb of charge prior to pouring. The low-quality melts in Fig. 9 were prepared under a glass cover to prevent ready access to oxygen from the air. The high-quality melts in Fig. 10 had no cover except the dross which was formed as a result of access to air. The broken lines represent the density values obtained on test bars cast in natural green sand molds. The solid lines are the data for the special calcined-clay molds baked at 1600 F and cooled to about 300 F at the time of pouring.

First, consider the broken-line curves—the data for natural green sand molds. Note that the density of the test bars increased as the pouring temperature decreased. At lower pouring temperature, less gas is absorbed from the moisture in the mold, resulting in an increase in density. Observe that the high-quality melts produced much sounder test bars than did the low-

Fig. 6—Photomicrograph of the leaky area in the lower portion of Quadrant 3 as shown in Fig. 5.



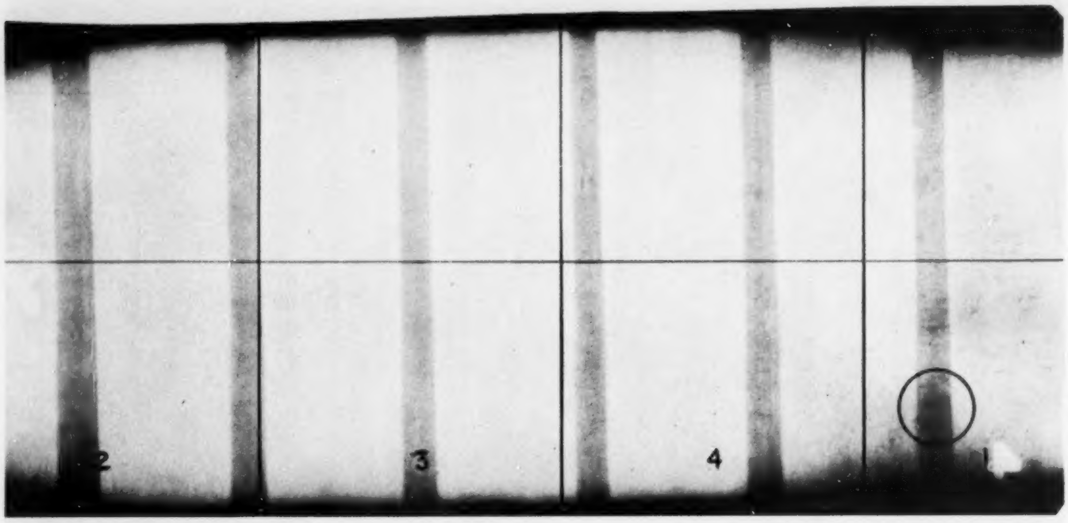


Fig. 7—Radiograph of cylinder cast in special baked mold at 2270 F from high quality melt. The mold was baked at 1600 F and cooled to 300 F for pouring. Density was 8.68 grams per cc, with a leak at 10 psi.

quality melts. This is a direct result of the difference in gas content of the melt before pouring and will be discussed in greater detail later.

Baked Clay Mold Inert

It was stated before that the baked calcined-clay mold was inert and did not cause gassing of the metal poured into it. The solid lines at the top of the graph are the data for calcined-clay molds. Note that the density values approach the theoretical maximum density value, which is 8.91 for the 85-5-5-5 alloy. Also note that the density values are practically independent of the pouring temperature, which indicates that this mold material is inert to the melt. If this mold material were not inert, then lower density values should have been obtained at the higher pouring temperatures as was the case for the green sand molds.

That melting practice does affect the gas content of the melt before it is poured is also evident by comparing the curves in Fig. 9 and 10. The melts of low quality in Fig. 9, poured in natural green sand molds, produced the lowest density castings. Even when poured in the inert calcined-clay molds, these low-quality melts produced slightly lower density castings than the high-quality melts in Fig. 10. Because the calcined-clay molds are inert, it must be concluded that these lower density values are a result of higher gas content of the melt, and that melting practice does affect the quality of the melt.

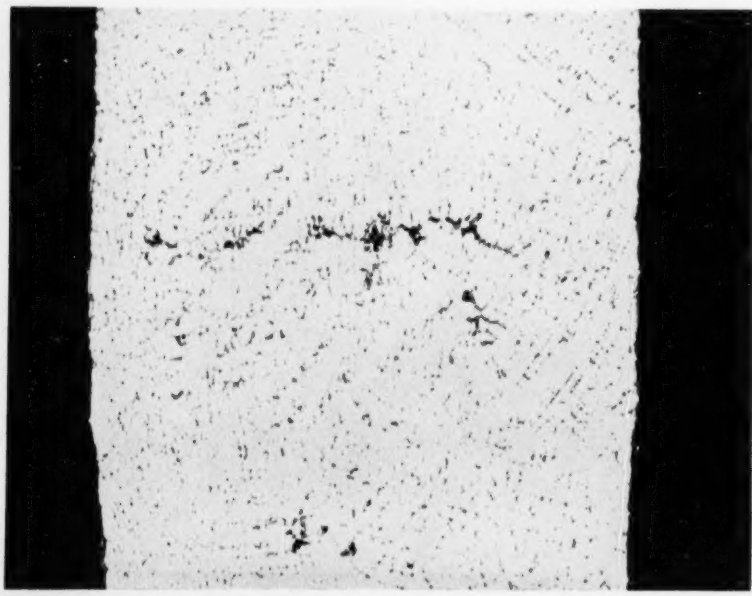


Fig. 8—Photomicrograph of the leaky spot in the lower portion of Quadrant 1 as shown in Fig. 7.

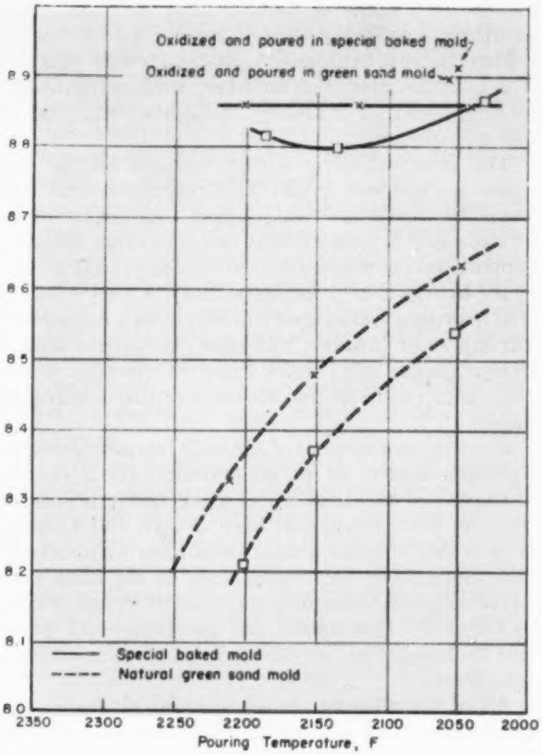


Fig. 9—Effect of mold material on density of horizontal 5/8-in. Web-Webbert test bars poured with 85-5-5-5 alloy of somewhat low quality.

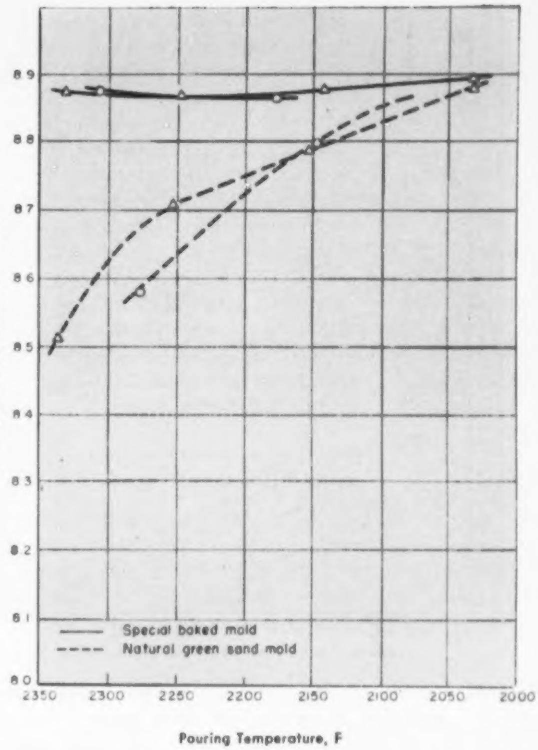


Fig. 10—Effect of mold material on density of horizontal 5/8-in. Web-Webbert test bars poured with 85-5-5-5 alloy of a high quality.

Benefits to be derived from melting under an oxidizing atmosphere are emphasized still further by some additional data in Fig. 9. Part of the molten metal from one of the low-quality melts, which was prepared under a glass cover, was retained in the furnace. The glass cover was removed and the melt was exposed to air for about 17 minutes. After this oxidation treatment, the melt was poured in the special baked calcined-clay mold and in a natural green sand mold.

The two isolated crosses at the top of Fig. 9 show that the oxidizing treatment made it possible almost to reach the theoretical maximum density of 8.91, as compared with a value of 8.63 when oxygen had been excluded from contact with the melt. The high density was obtained after the oxidation treatment because the gas content of the melt before pouring was low. In the case of the green sand mold, the density was high not only because the melt in the pot had a low gas content,

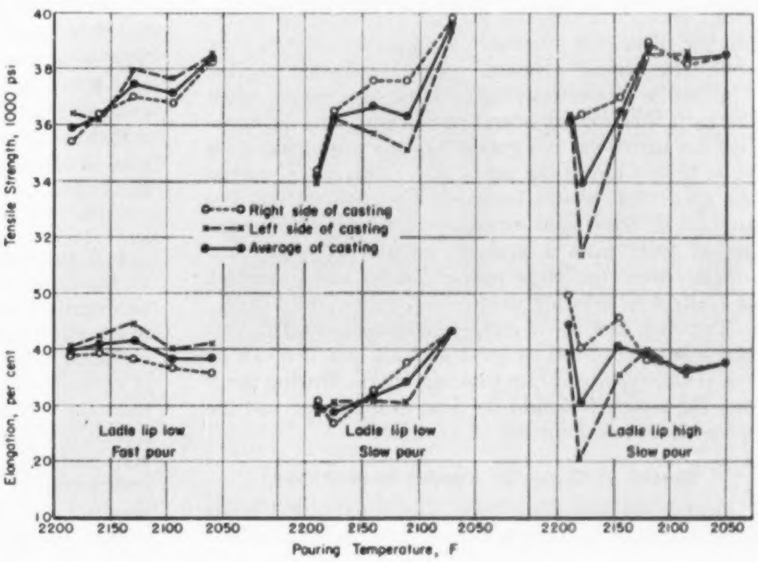


Fig. 11—Effect of pouring practice on tensile properties of the 5/8-in. Web-Webbert test-bar casting made from a high quality melt of 85-5-5-5 alloy.

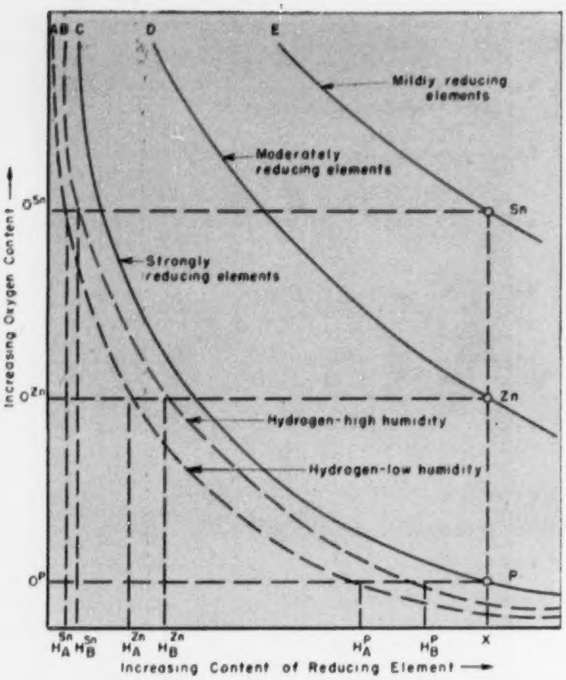


Fig. 12—Solubility relationship between oxygen and hydrogen in copper-base alloy melts.

but also because a low pouring temperature was employed and thus gassing from the green sand mold was minimized.

Up to this point, it has been established that melting practice does affect melt quality. It has also been established that mold materials can affect the quality of the molten metal in the mold cavity. The adverse effect of high pouring temperatures was also indicated. The next graph, Fig. 11, illustrates the effect of pouring practice on the tensile properties of 85-5-5-5 alloy.

It can be seen from Fig. 11 that when the ladle lip was close to the sprue and the sprue was full at all times, the tensile properties of duplicate bars were fairly consistent over the range of pouring temperatures. When the ladle lip was kept close to the sprue, but the sprue was purposely not filled throughout the pour, the tensile properties were somewhat erratic. The tensile properties were exceptionally erratic when the melt was poured from some height into the sprue and the sprue was not full at all times. Pouring from some height above the sprue and attempting to keep the sprue full would be quite difficult and was not attempted. Somewhat erratic properties could be expected from such a practice because of severe turbulence from the large pressure head and from lack of control in keeping the sprue actually full.

The data in Fig. 11 merely emphasize the fact that the beneficial effects of good melting practice can be lost if improper pouring practice occurs. During pouring, the ladle lip should be close to the sprue and the sprue should be kept full at all times.

Theory of Gases in Copper-Base Alloys [1]

During the preceding discussion, high-quality melts were described as being synonymous with melts of low gas content. Melts of 85-5-5-5 alloy prepared under oxidizing conditions were shown to be of low gas content because castings of high density were obtained. The question may well be asked, what occurs during melting under an oxidizing atmosphere that produces low gas content?

The most satisfying answer is based on the principles worked out by Sieverts and Allen and their associates. Sieverts [2,3] established that the solubility of hydrogen in copper, and in many other metals, is proportional to the square root of the partial pressure of the hydrogen over the melt. Later, Allen[4,5,6] showed that hydrogen and oxygen can coexist in a copper melt. For this to be possible, hydrogen and oxygen must be in equilibrium with water vapor in the melt or with the water vapor in the atmosphere surrounding the melt.

If the oxygen content of the melt increased, then the hydrogen content of the melt would have to decrease as illustrated by Curve A in Fig. 12. Curve B indicates that the concentration of both oxygen and hydrogen is increased if more humid conditions exist over the melt. Increasing the temperature of the melt excessively will shift the equilibrium Curves A and B closer to Curve D. This means that the amount of oxygen and hydrogen that can coexist in the melt is increased considerably.

All of the alloying elements added to copper have a tendency to combine with oxygen, i.e., they are strongly reducing elements. In a qualitative manner, Curve C in Fig. 12 represents the condition for alloys containing strongly reducing elements such as phosphorus, aluminum, beryllium, or chromium. The equilibrium curve would be higher for alloys such as 85-5-5-5 which contain some zinc. This condition is represented by Curve D. Alloys which contain reducing elements such as tin, lead, or nickel are represented by Curve E.

To show the effect of alloying elements on the content of oxygen and hydrogen that can be presented, assume that X per cent of Sn, Zn, or P is present in the copper. In the case of X per cent Sn, the maximum possible oxygen content is at 0^{Sn} per cent as shown in Fig. 12. Then the maximum possible hydrogen content is H^{Sn} for low humidity and H^{Sn} for high humidity. The oxygen and hydrogen contents for X per cent Zn and P can be traced in a similar manner. It becomes evident that as more strongly reducing elements are added to the melt, the maximum possible oxygen content is lowered and a corresponding increase in the maximum possible hydrogen content occurs.

Effect of Oxidation

It is apparent that a melt should be prepared under an oxidizing atmosphere to keep the hydrogen content to a minimum. This type of melting practice is particularly effective for alloys which do not contain strongly reducing elements. After the oxidizing treatment, it is necessary to deoxidize by the addition of a strong reducing element such as phosphorus. This produces a melt low in oxygen content as well as low in hydrogen content. Consequently, during solidification, the concentration of oxygen and hydrogen is too low to produce the steam reaction which is manifested as microporosity in the solidified casting.

If the same melt were poured at a high temperature in a sand mold, a reaction will occur between the melt and the moisture in the mold. This reaction will supply additional oxygen and hydrogen to the melt. With the high concentration of oxygen and hydrogen now in the melt, the steam reaction will occur during solidification to form microporosity.

The curves in Fig. 12 show why melting under an oxidizing condition and subsequent treatment with a deoxidizer is more effective in producing a high-quality melt when less reducing alloying elements are present in the melt. Under oxidizing conditions, a copper-tin alloy will have a high oxygen content and a low hydrogen content. Deoxidation before pouring will place both the oxygen and hydrogen contents at a low level, so that formation of steam will be avoided during solidification.

If a stronger reducing element such as zinc is present in the melt, the oxygen content will be lower and the hydrogen content will be higher. After deoxidation, this will leave the oxygen and hydrogen contents in the copper-zinc alloy closer to the equilibrium concentration. During solidification, the equilibrium concentration of oxygen and hydrogen is more readily exceeded and thus the copper-zinc alloy is more apt to appear gassed than the copper-tin alloy.

Poor Melting Practice

Now consider a melt prepared under a reducing atmosphere. The oxygen content will be low and the hydrogen content will be high. After deoxidation and during solidification, the steam reaction may not occur because of the low oxygen content, unless oxygen is supplied during the pour. The moisture in sand molds actually supplies an abundance of oxygen, and, therefore, the steam reaction occurs quite extensively, producing very low density in the casting. If the mold material were inert, as is the special baked calcined-clay mold, then gas evolution may still occur to some extent as a result of the decreased solubility of the hydrogen during solidification.

In this article, hydrogen was considered to be the undesirable gas which produced unsoundness in castings, either by evolution to form molecular hydrogen or by reaction with oxygen to form steam. Carbon and sulphur in the melt could react in a manner similar to hydrogen in forming gaseous oxides which form voids in the casting. Carbon is no longer considered a possible gas former because of its very low solubility in copper. Whether or not sulphur contributes to unsoundness is still a matter of conjecture. For the present, it can be considered as being of relatively little importance because of the tremendous effect exerted by hydrogen.

Methods for Degassing Melts

The most common method employed to subject a melt to oxidizing conditions is to maintain an oxidizing atmosphere during melting. An oxygen content of about 0.5 per cent in the products of combustion of a gas flame will serve this purpose. Another method of maintaining oxidizing condtions is to utilize an oxidizing slag or flux. Mixtures such as 1 to 3 parts of Cu_2O, 1 part sand, and 1 part borax have been used successfully to degas melts. Perhaps it is unnecessary to mention it, but damp tools, green crucibles, and green transfer ladles can gas a melt severely. Thoroughly cured and preheated furance liners and ladles are absolutely essential for the production of high-quality melts.

It has been stated that those melts which contain less strongly reducing alloying elements are the most amenable to degassing by oxidation treatment. To reduce the gas content of alloy melts which are strongly reducing, the use of a scavenging gas is particularly effective. In this method, nitrogen is bubbled through the melt. As the nitrogen bubbles rise through the bath, hydrogen diffuses from the melt into the bubbles to form molecular hydrogen. In this manner, the hydrogen escapes with the nitrogen into the atmosphere.

Acknowledgment

Much of the data presented were obtained on research sponsored by the Brass and Bronze Ingot Institute and permission for publication is gratefully acknowledged. The radiographs were prepared by M. D. Phillips and the photomicrographs were prepared by C. W. Barnhart.

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Announce 1954 Hoyt Lecturer

H. W. Dietert

Following its meeting in Chicago, June 26, the Charles Edgar Hoyt Annual Lecture Committee announced the selection of Harry W. Dietert to deliver the Hoyt Lecture at the 1954 AFS Convention in Cleveland.

Mr. Dietert is president, Harry W. Dietert Co., Detroit, and is a former national director of the Society. He has authored many technical papers on sand control and was also the author of the AFS publication, "Foundry Core Practice."

The subject of Mr. Dietert's lecture has not as yet been announced. The annual Charles Edgar Hoyt Lecture is one of the technical highlights of the AFS Convention and Foundry Congress.

Now, There's an Idea!

Practical ideas, developed and proved in foundries and pattern shops, are presented in this column. "Now, There's an Idea!" helps *American Foundrymen* readers promote the exchange of ideas, the motivating force behind the A.F.S. Contributions for publication are solicited. They may be of any length, preferably short and illustrated.

A height-of-charge indicator has been developed for use with the cupola pyrometer developed by R. I. Taylor (*"How to Thermocouples in the Stack Control Cupola Melting,"* AMERICAN FOUNDRYMAN, December 1952, page 46) to record the position of the top of the charges in the cupola stack during operation. A simple apparatus, it consists of a lamp indicator actuated by a "thermostat" attached to the cupola stack, and is especially useful for cupolas mechanically charged from ground level. The diagram gives a general arrangement of the device as installed. The equipment is well within the means of all foundries. Note that the gadget is set flush with inner wall of the cupola stack and that the distance between the working end of the height-of-charge indicator and the Thermocouple should be not less than 2 ft. A standard thermostat of the type usually adopted for electric cookers should be used.

Here's how the indicator works. While the cupola is blowing, and the charge burden is below level *A* in the cupola shaft, hot waste gases will by-pass instrument orifice *O* and pass directly up the stack. Addition of charges to bring the level up to point *B* will cover the instrument orifice.

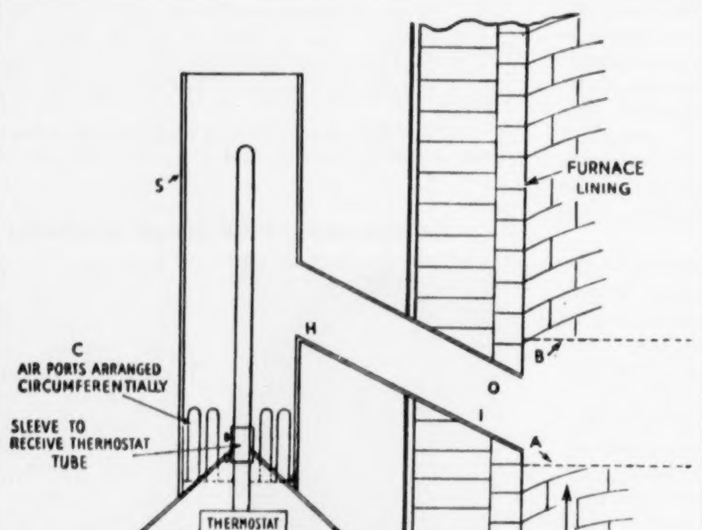
At this stage, the charge materials offer some resistance to the free passage of the hot cupola gases and some of these take the line of least resistance in passing through chimney *S* of the height-of-charge indicator. The thermostat tube contained in the chimney will be raised in temperature and the thermostat is arranged to switch off an indicator light. This light can be located at any suitable position where it is visible to charging personnel. The hot gases have a free outlet at the top of the chimney of the apparatus, or may, if necessary, be led back into the cupola stack or be discharged through the roof to atmosphere.

When the light is extinguished, charging stops, and melting proceeds until the stack level drops to point *A*. The thermostat will then cool, as the hot gases again by-pass orifice *O* and the charging light will go on to signal that a fresh charge is required to maintain the burden level at the correct height.

One would expect a time lag after hot gases have stopped passing through the apparatus, because of the heated apparatus maintaining the temperature of the thermostat tube and delaying its cooling. To prevent this, natural draft induced in the hot chimney *S* is used to draw in cool air through ports *C*. This improves the response of the instrument and at the same time evacuates coke breeze, etc., blown into the tube, which would otherwise build up on the thermostat. For a similar reason, the mild-steel tube *H-I* is sloped.

This equipment was first installed about 16 months ago and after but slight modification has been in continuous use since September 1952, without any fault developing. The setting of the thermostat control is a simple matter and does not warrant any explanation. It must be remembered that the apparatus does not function when the blast is shut off, but for that matter the height of the cupola burden should not fall appreciably during any such period.

This IDEA was originally reported by R. I. Taylor, chief metallurgist, Suffolk Iron Foundry (1920), Ltd., Stowmarket, in *Foundry Trade Journal,* from which AMERICAN FOUNDRYMAN reprinted the story referred to above as well as this condensation.



Section (not to scale) of height-of-charge indicator for cupola. Comparative dimensions are: Length of pyrometer stem, 15 in.; tube entering furnace wall, 2½-3 in. dia.; vertical tube, 3½-4 in. dia.; gas inlet to top of tube, 24 in.; gas inlet to bottom of tube, 4 in.

MAURICE CODELL and ALLEN CHERNEY

/ *Pitman-Dunn Laboratories Department*
Frankford Arsenal, Philadelphia, Pa.

Determination of Magnesium in Titanium

Magnesium in titanium metal may be determined by dissolving the metal in hydrochloric acid, oxidizing with nitric acid, followed by double precipitation as the ammonium phosphate salt using ammonium citrate to hold titanium and other interfering elements in solution. The precipitate is finally ignited to magnesium pyrophosphate. Manganese interferes and may be removed by adding ammonium persulphate to a boiling solution of the first precipitate of magnesium ammonium phosphate which is slightly acidic with sulphuric acid. It is possible to determine quantities of magnesium as low as 0.1 mg per gram of titanium by this method.

▪ Magnesium may be separated from titanium by precipitating magnesium as the ammonium phosphate salt in the presence of a citrate. The presence of a citrate is necessary to prevent the precipitation of titanium, iron, calcium and other phosphates[1]; however, the precipitation of magnesium as the ammonium phosphate salt is somewhat slower than usual magnesium ammonium phosphate precipitations. This phenomenon is due to the presence of a large quantity of titanium during the first precipitation. When the magnesium content is very low (0.1 to 1.0 mg), satisfactory precipitations of magnesium ammonium phosphate are obtained by shaking the cold solution energetically for approximately one hour. A mechanical shaker is necessary. Satisfactory results were obtained by shaking for a shorter period of time. However, the recommended one-hour period allows for a considerable margin of safety.

Double precipitation serves a dual purpose in this procedure. The last traces of titanium are eliminated and a more nearly ideal composition of magnesium ammonium phosphate is obtained.[2]

Two techniques were used to dissolve the sample. One required solution of the sample in hydrofluoric acid and treatment with boric acid in order to bind fluorine as the harmless fluoboric acid. While very satisfactory results were obtained, the conditions of precipitation had to be critically maintained. Precipitation of magnesium ammonium phosphate is speeded when solution is made with hydrochloric acid.

If manganese is present, much of it may be carried through as manganese pyrophosphate and erroneously calculated as magnesium pyrophosphate. Therefore, manganese is completely removed by precipitating as the dioxide by the addition of ammonium persulphate to the boiling slightly acidic solution after the first precipitation of magnesium ammonium phosphate.[3]

Special Reagents

Ammoniacal Ammonium Citrate Wash Solution: 15 grams of ammonium citrate and 50 ml concentrated ammonium hydroxide per liter of distilled water.

Ammonium Hydroxide-Ammonium Persulphate Wash Solution: Dissolve 20 grams of ammonium persulphate in 1 liter of diluted ammonium hydroxide (2:98).

Ammonium Hydroxide Wash Solution: 50 ml of concentrated ammonium hydroxide per liter of distilled water.

Methyl Red Indicator: Dissolve 0.1 gram methyl red in 100 ml of ethyl alcohol.

Procedure

1. To a 1-gram sample of fine drillings in a 500-ml Erlenmeyer flask, add 25 ml of concentrated hydrochloric acid. Place on hot plate at a low heat to dissolve.

2. Add 2 ml of nitric acid (2:3) and remove the flask immediately from the hot plate. Swirl the solution and cool to room temperature.

3. Add 2 grams of citric acid and 100 ml of cold distilled water. Mix thoroughly. Place immediately in an ice bath. (Titanium compounds may precipitate at this point due to hydrolysis, but they will redissolve later upon the addition of ammonium hydroxide.) Cool below 15 C.

4. Add concentrated ammonium hydroxide slowly and with constant swirling until the solution becomes neutral to methyl red. Add 20 ml of concentrated ammonium hydroxide in excess. Cool to approximately 10 C.

5. Add 5 grams of diammonium phosphate. Stopper and shake on a mechanical shaker. Shaking approximately one hour is recommended to initiate precipitation, if quantity of magnesium present is very small (0.1 to 1.0 mg); otherwise, a lesser period is required. If the diammonium phosphate is not entirely in solution, it will dissolve upon shaking when room temperature is approached. Allow the precipitate to stand overnight.

6. Filter on a No. 42 Whatman filter paper or equivalent. Wash flask with ammoniacal ammonium citrate wash solution. Wash residue three times with small portions of ammonium hydroxide wash solution. Discard the filtrate.

7. If manganese is not present, use the procedure in sections 12 through 14. If manganese is present, use the procedure in sections 8 through 11.

8. Place a 250 ml beaker under the funnel. Add 5 ml of hot sulphuric acid (1:20) to the flask and swirl to dissolve any material which may have adhered to the walls. Transfer to the filter paper. Dissolve the precipitate with two 5-ml portions of hot sulphuric acid (1:20). Wash the flask twice with 5-ml portions of hot water and transfer to the funnel. Wash filter paper with five 5-ml portions of hot water.

9. Make filtrate alkaline to methyl red with concentrated ammonium hydroxide. Add sulphuric acid (1:20) dropwise until just acid. Add 2 drops in excess. Place on hot plate and bring to a boil.

10. Add 1 gram of ammonium persulphate to the boiling solution. Boil 3 to 5 minutes until manganese dioxide is precipitated. Cool in water bath. Filter on a No. 42 Whatman filter paper or equivalent. Wash several times with ammonium hydroxide-ammonium persulphate wash solution. Discard the residue.

11. Using filtrate, continue in accordance with sections 13 and 14.

12. Place a 250-ml beaker under the funnel. Add 5 ml of hydrochloric acid (1:3) to the flask and swirl to dissolve any material which may have adhered to the walls. Transfer to the filter paper. Dissolve the precipitate with five 5-ml portions of hydrochloric acid (1:3) from a wash bottle. Wash the flask twice with 5-ml portions of water and transfer to the funnel. Wash filter paper with five 5-ml portions of hot water.

13. Add 0.2 gram of diammonium phosphate and 0.2 gram of citric acid. Filter on No. 42 Whatman filter paper or equivalent. Discard residue. To the filtrate add ammonium hydroxide (1:1) from a burette slowly and with constant stirring until just alkaline to methyl red. Add dropwise and with constant stirring 15 ml of ammonium hydroxide (1:1) in excess and place in an ice bath for 15 minutes. Stir vigorously until a precipitate appears, taking care, however, not to scratch the sides of the beaker. Allow to stand in the ice bath four hours or longer. Filter on a No. 42 Whatman filter paper or equivalent; wash thoroughly with ammonium hydroxide wash solution.

14. Place filter paper in tared porcelain or platinum crucible. Ignite at a low heat until the paper is charred. Increase heat until the carbon is burned off. Finally, ignite on a blast burner for 5 to 10 minutes. Weigh as magnesium pyrophosphate.

The percentage of magnesium is calculated as follows:

$$A = \frac{B \times 0.21851 \times 100}{C}$$

A = percentage of magnesium; B = weight of magnesium pyrophosphate; C = weight of sample taken.

Results of Magnesium Determinations

Per Cent Added	Per Cent Mg Recovered Average	Per Cent Standard Deviation	Number of Determinations
0.010	0.012	0.0014	5
0.020	0.021	0.0017	3
0.030	0.032	0.0000	2
0.040	0.038	0.0012	3
0.050	0.050	0.0002	5
0.060	0.064	0.0000	2
0.070	0.072	0.0010	2
0.080	0.081	0.0020	3
0.090	0.090	0.0000	2
0.100	0.099	0.0030	4
0.110	0.108	0.0014	2
0.120	0.118	0.0028	2
0.130	0.129	0.0000	2
0.150	0.151	0.0000	2
0.160	0.161	0.0010	2
0.170	0.170	0.0000	2
0.180	0.179	0.0000	2
0.190	0.189	0.0028	2
0.200	0.199	0.0012	6
0.300	0.300	0.0033	7
0.400	0.399	0.0020	6
0.500	0.500	0.0014	6

In these analyses magnesium was added from a solution prepared by dissolving magnesium (99.98 per cent pure) in hydrochloric acid. One gram of cast

titanium drillings was used in each of these analyses. The titanium, when examined spectrographically, showed a magnesium content of 0.001 per cent. A reagent blank should be run with each set of determinations.

The following results were obtained using 1 gram samples of titanium containing 5 per cent electrolytic manganese. Manganese was subsequently removed as described in procedure.

Per Cent Mg Added	Per Cent Mg Recovered
0.085	0.083
0.064	0.063
0.084	0.085
0.053	0.054
0.010	0.011

Discussion

The quantity of titanium used has been found to be critical. This procedure was developed for a 1-gram sample and quantities much in excess of this amount retard precipitation and lead to low results.

An investigation was made regarding the possibility of using 8-hydroxy-quinoline as a precipitating reagent for magnesium in titanium. This procedure may be satisfactory for magnesium in the presence of small quantities of titanium when precipitation is made from an alkaline tartrate solution[4]. However, when the main constituent is titanium, no separation could be made by this procedure. The precipitation of magnesium as the hydroxy-quinolate was attempted after a preliminary separation as the ammonium phosphate salt followed by removal of phosphate as the ammonium phosphomolybdate compound. Considerable difficulty was experienced in preventing the reagent itself from precipitating, probably due to the presence of large concentrations of salts. Careful control of quantities of reagent failed to produce consistent results.

Acknowledgment

The authors wish to gratefully acknowledge the valuable suggestions made by Dr. John L. Hague, of the National Bureau of Standards, and the assistance of James J. Mikula, who performed many of the analyses reported here.

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Calendar of Future Meetings and Exhibits

August

10-12. . Dietert Sand School
Detroit Engineering Society, Detroit.

10-19. . Advanced Cast Metals Practice
University of Michigan, Ann Arbor, Mich.

September

1-3 . . Institute of Australian Foundrymen
Town Hall, Sydney, Australia. New South Wales Div: Convention.

13-24 . . 1st International Instrument Congress and Exposition
Philadelphia

17-18. . National Foundry Association
Plaza Hotel, New York. Annual meeting.

17-18. . Niagara Frontier Regional Conference
Statler Hotel, Buffalo.

19-26. . International Foundry Congress
Paris, France. Host: Association Technique de Fonderie de France.

21-22. . Steel Founders' Society
Homestead, Hot Springs, Va. Fall meeting.

21-25. . Instrument Society of America
Sherman Hotel, Chicago. National Congress & Exhibit.

24-25. . Ohio Regional Foundry Conference
Netherland Plaza, Cincinnati. Sponsored by A.F.S. Cincinnati, Northeastern Ohio, Central Ohio, Canton, and Toledo Chapters.

25. . Malleable Founders' Society
General meeting.

October

8-9. . Michigan Regional Conference
Michigan State College, East Lansing, Mich. Sponsored by A.F.S. Central Michigan, Western Michigan, Detroit and Saginaw Valley Chapters and Michigan State and University of Michigan Student Chapters.

8-9. . Gray Iron Founders' Society
New Hotel Jefferson, St. Louis. Annual meeting.

9-15. . 5th International Congress of Mechanical Manufacture
Turin, Italy. Production methods and parts assembly.

15-17. . Foundry Equipment Manufacturers' Association
Greenbrier, White Sulphur Springs, W. Va. Annual meeting.

16-17. . Northwest Regional Conference
University of Washington and New Washington Hotel, Seattle. Sponsored by Washington, Oregon, and British Columbia Chapters, and University of Oregon Student Chapter.

19-21 . . American Institute of Mining and Metallurgical Engineers
Hotel Allerton, Cleveland. Fall meeting of Institute of Metals Div.

19-23. . American Society for Metals
Cleveland Auditorium, Cleveland. 35th National Metal Exposition and Congress.

23-24 . . New England Regional Foundry Conference
Massachusetts Institute of Technology, Cambridge, Mass.

23-24 . . National Noise Abatement Symposium
Illinois Institute of Technology, Technology, Center, Chicago.

News of Technical Committees

Safety Committee

Chairman of this Committee meeting was J. W. Young, safety director, International Harvester Co., Chicago. He presided over a session that met in Chicago on June 24, 1953.

The Committee began work on the manual: *Recommended Good Safety Practices for the Protection of Workers in Foundries*, reviewing the first sections, which had been revised at previous meetings. After these sections had been approved, that on plant physical safeguards was reviewed and some slight changes made. The section on melting, oven, furnace and auxiliary equipment and operations was reviewed critically. Several changes and recommendations were made for this material. It will be rewritten and sent to members of the Committee for review and final revision at the next meeting.

Discussed Safety Posters

A discussion on safety posters was then held, with reference to the annual contest conducted each year by the Steel Founders' Society. It was agreed that those posters that were not judged as winners had considerable merit and might well be used either in AMERICAN FOUNDRYMAN or be reproduced by multilith or other process for distribution to foundries. It was also suggested that the National Safety Council might be contacted about the possibility of their producing the posters.

A discussion followed on the advisability of AFS conducting an industry-wide safety contest. Various types and methods were discussed. The idea was tabled until the present project of revising the Safety Manual is concluded.

Accident statistics were examined and it was found that foundry rates are not listed separately in many states, but are included in the general manufacturing categories. It was agreed that the Committee should cooperate with other societies and associations in the foundry field in compiling specific accident-rate statistics that would apply only to the industry.

After these subjects had been disposed of, the Committee resumed work on the revised manual. Certain assignments were made to Committee members who volunteered to prepare specific sections in time for the next Committee meeting, which was set for November 5, 1953. No meeting was scheduled for October because of the National Safety Congress to be held that month.

Dust Control & Ventilation

A meeting was held in Chicago on May 6 by the Dust Control & Ventilation Committee with John G. Liskow, chief engineer, dust control division, American Air Filter Co., Inc., Louisville, Ky., presiding.

The proposed Check List of Foundry Operations which may cause Internal and External Air Pollution was briefly reviewed. Significant changes were recommended, since it was agreed that, in its present form, the list would be confusing to the average foundry operator. The Committee agreed that the list should be re-submitted for approval and additional comments at the next meeting.

Work was continued on the new *Dust & Ventilation* manual. The Committee was cautioned that care should be exercised in the writing of recommendations for foundry ventilation to eliminate any of those practices that are not approved by the Committee.

W. W. Dodge, Caterpillar Tractor Co., Peoria, Ill., outlined what he is proposing to add to that material upon which he is working, and gave some details as to the drafting of the layout by adding sketches.

Material that had been submitted by B. A. Dean, Ford Motor Co., Dearborn, Mich., was reviewed and some slight changes made. The material will be revised and submitted in final form at the next meeting.

Shell Molding Materials Testing

The third meeting of the Shell Molding Materials Testing Committee was called to order by Chairman G. A. Conger, Cambria Foundry & Engineering Co., Ebsensburg, Pa. on May 5, at Chicago's Hotel Sherman.

Experiences encountered by members in producing test specimens under standard testing procedure adopted at the last previous meeting, held in Pittsburgh, Pa., were discussed.

It was suggested that a standard oven should be employed when conducting the tests in order to eliminate the variable due to heat fluctuation in different types of ovens. This recommendation was not adopted because it was thought to be too costly a procedure.

Suggestions on various methods of dumping resins, and an increase of cure time from 5 to 8 minutes were tabled without recommendation.

The Committee, after further discussion, felt that a different type of machine may be necessary to insure more accurate tensile testing. At present, some transverse effect is indicated on the Deadweight Pendulum-Type Tester. The Committee decided that no more tensile tests will be started, pending the examination of tensile test data submitted by members of the group. Prior to the establishment of the next type of test, the possibility of correlating test date to the finished casting should be examined.

Newly elected officers and directors of the Northern California Chapter shown above from left to right are: Charles Marshall, Industrial Foundry Supply Co., director; John Bermingham, E. F. Houghton & Co., program chairman; W. S. Gibbons, Ridge Foundry Co., chairman; Clayton D. Russell, Phoenix Iron Works, assistant program chairman, and H. Hirsh, American Manganese Steel Co., director.

Test your foundry knowledge with "The Foundry Quizmaster," a new feature of *American Foundryman* which will appear from time to time. Your reward for taking the quiz: Increased knowledge of foundry practice. The Quizmaster will deal with practical foundry subjects and cover the range of the cast metals. This month his subject is *Aluminum Casting Practice*. Answers will be found on page 96. If you don't agree with the Quizmaster, write a letter to the editor.

1. Should pourers wear leggings under or over their trouser legs?
2. Should crane operators wear bifocal glasses?
3. How should maintenance people protect themselves when working on or adjacent to crane ways?
4. Are there safety programs for hookers?
5. Should prospective cranemen be put through any training before they actually become cranemen?
6. Is there any method of eliminating ladders so that crane operators and maintenance men will not have to climb a ladder to reach the cab of the crane? Are crane cabs made that the operator can enter without climbing over the side of the cab?
7. Should sand slinger operators be required to wear respirators?
8. What hygiene problems are involved in the use of pressurized respiration helmets as used by blasting operators?
9. What are the limitations on use of filter type respirators?
10. Are departmental contests and plant contests for safety helpful?
11. Is a poster campaign of any value to the safety program? How should it be used?
12. What formula should be used in calculating the proper width of trucking aisles?
13. Why not permit work-saver operators to ride their vehicles in order to prevent an accident in which the operator is pinned between the wheel and some fixed object?
14. What precautions should be taken with cables and slings?
15. Do employees participate in a safety suggestion program?
16. What is the justification for an active accident prevention program?
17. How do you introduce new employees to a safety program?
18. What factors insure a successful safety suggestion program?

See page 74 for answers to these questions.

AFS Needs Used *Transactions*

There is an urgent need at National Headquarters of American Foundrymen's Society for used, bound volumes of the official Society publication, *Transactions* for the years 1930-1952. The 1952 volumes, in particular, are in very short supply, having been exhausted six months after being placed on sale. Although Volume 60 is particularly needed at this time, requests are constantly being received at Headquarters for copies dating as far back as 1930. Anyone who wishes to dispose of back issues of *Transactions* should contact AFS immediately.

Heavy Demand

The demand for back issues of *Transactions* results from the continuing increase in membership of AFS, and constant requests from libraries, research laboratories, universities, and other technical institutions.

All volumes submitted to Headquarters must be in good condition, unmarked and untorn, and must be packed to travel safely through the mails. If accepted, they will be re-purchased at the rate of $2.50 for each volume.

Copies should be mailed to the attention of the Book Section, American Foundrymen's Society, 616 South Michigan Avenue, Chicago 5, Illinois.

N.F.A. Annual Meeting Scheduled For New York

Having discovered a highly successful formula in its meeting last year, National Foundry Association is not going to quarrel with that formula at this year's 55th Annual Meeting at the Plaza Hotel, New York, September 17-18. The program will be an improved version of the sessions that proved so highly stimulating for representatives of foundry management who attended last year.

Realizing that speeches are no better than the speakers, N.F.A has expended much time in securing men of the highest national reputation to address the meetings and to participate in the labor-management panel discussions. Outstanding Congressional leaders, prominent economists, an industrial marketing specialist, an authority on industrial hygiene and air pollution, high-ranking union leaders, and

W. S. Brunk . . . N.F.A. President

eminent representatives of management—all will be present to contribute their ideas.

The program has been designed to advance the primary purposes of the association, the oldest management group in the country. Formed originally in 1898, N.F.A. has continued to serve foundry management faithfully for 55 years, as the industry spokesman in national affairs, as counselor in labor relations, as informant on all matters pertaining to management other than technical, as advisor and representative on national legislation.

Vigorous leadership characterizes N.F.A. and has developed new methods of improving and extending the services of the association. A weekly newsletter, an annual wage survey, bimonthly reports on all court cases involving labor questions and NLRB, and arbitration decisions, are all now regular services. In addition, N.F.A. prepares special surveys, reports, and other projects.

British Foundrymen Hold 50th Meeting

E. Longden . . . new I.B.F. head

The fiftieth Annual Conference of the Institute of British Foundrymen was held from June 16 to 19th at one of Britain's largest seaside resorts, Blackpool. Visited by millions of holiday-makers in the summer, Blackpool was chosen as the venue of the Conference because it has abundant first-class hotel accommodation, numerous halls and restaurants, which were easily adapted for the various conference sessions, and it offers many catering facilities which were invaluable for the various social functions of the Institute.

At the Conference, Dr. C. J. Dadswell, who is well-known in American steel foundry circles, completed a most successful year of office, and was succeeded as President by Mr. E. Longden. Mr. Longden also is well-known in the United States, which he has visited on several occasions, and he has had a vast experience in managing foundries of various types in Great Britain.

During the Annual General Meeting, the Institute's awards were presented as follows:

The **Oliver Stubbs Medal** to Mr. G. W. Nicholls, who was the author of the Institute of British Foundrymen exchange paper to the recent AFS convention in Chicago.

The **E. J. Fox Medal** to Sir William J. Larke, in recognition of the encouragement he has given to the foundry industry in many capacities.

The **Meritorious Service Medal** to Mr. Harold Haynes of the National Gas Engine Company, Manchester, in recognition of his very active work over a long period in giving his knowledge and experience for the benefit of others.

The **British Foundry Medal and Prize** presented by the Foundry Trade Journal to Mr. D. F. B. Tedds for a paper on "Experiences with the Investment Casting Process."

Mr. Longden's Presidential Address on Science, Technology and Craftsmanship was a masterly review based upon years of practical knowledge and experience in the industry, and was followed by the delivery of the 16th Edward Williams Lecture on "Aspects of Nuclear Fission of Interest to Foundrymen and Metallurgists" by E. W. Colbeck, M.A., Technical Director of Hadfields Limited, the well-known British steel founders.

The first paper to be presented was the official exchange paper from the American Foundrymen's Society by B. N. Ames on the subject of Shell Molding. A paper on the same subject by a British author, D. N. Buttry, was also presented at the same session. These two papers aroused enormous interest and produced a valuable discussion. A paper on "Pelleted Foundry Pitch" by three British authors, Messrs. E. Brett Davies, T. F. N. Matthews and G. Smart, dealt with a somewhat novel subject and also aroused much interest. Foundry molding materials were also dealt with, in a paper on "The Effect of Heat on Clays and Its Bearing on the Life of Clay Bonds," by Dr. J. White and S. Davison, B.Sc., and in a paper on "Some Effects of Mold Resistance on Internal Stress in Sand Castings" by Dr. R. N. Parkins and Dr. A. Cowan. J. W. Grant of the British Cast Iron Research Association produced a most interesting account of results obtained by the Association entitled "Some Growth Characteristics of Ingot Mold Irons in Air and Vacuum."

As was expected, the usual session on practical foundry subjects, which was held on the 18th June, attracted a large attendance. J. R. Charlton gave a fascinating description of foundry operations in his paper on "Production of Diesel Engine Castings." D. Fleming of Textile Machinery Manufacturers spoke on "Some Thoughts on the Cupola"; and B. Gale of the same Company gave a first-class review of modern development in this field in a paper entitled "Foundry Developments in the Textile Industry."

The non-ferrous session included papers on "The Effect of Pouring Conditions on Shrinkage Unsoundness in Bronze Ingots Cast in Metal, Carbon or Sand Molds" by Dr. Pell-Walpole, a paper on "Difficulties Experienced in the Production of Centrifugally-cast Nickel-Bronze Bearing Shells" by J. Taylor, Z. Stokowiec and R. S. Jackson; and the report of the Institute's own Sub-Committee T. S. 38 on "Economic Utilization of Copper-base Alloys."

Another American paper received and discussed with great interest was on the "Pressure Feeding of Steel Castings at Pressures Higher than Atmospheric Pressure" by C. W. Briggs and Professor Howard F. Taylor. At the same session the British Steel Founders Research Association and the British Cast Iron Research Association collaborated in the presentation of work which they have done on the suppression of dust in the foundry, and illustrated their work with some most interesting films.

The Light Alloys sessions included two papers, one on the "Modification Methods of High-Silicon Aluminum Alloys and their Influence on Structure", by C. Mascre of the Centre Technique de Fonderie in Paris, which was the official exchange paper of L'Association Technique de Fonderie, and a paper by Miss Whitaker of the British Non-Ferrous Metals Research Association on "Mold Reaction in Aluminum Alloy Castings."

Although Blackpool is not situated in an industrial area, careful planning and timing enabled organized parties of members to inspect foundries in industrial areas 50-70 miles away.

Social activities included organised lunches, the Institute's annual Banquet, which was addressed by the Mayor of Blackpool in a wise and witty speech; Sir William Larke; Mr. F. Scopes, President of the Joint Iron Council; the President of the Institute, Mr. Longden; the ex-President, Dr. C. J. Dadswell; and the Vice-President Mr. John Bell.

Quizmaster

These answers to the questions on page 70 were provided by the Safety Committee during a Safety & Hygiene & Air Pollution session of the 1953 AFS Convention.

1. They should wear leggings over their trousers, pulling the trousers up at the knee so that they will blouse over the leggings, eliminating a pocket which could hold molten metal. Leggings can still be removed quickly and easily.
2. No. Bifocal glasses may tend to distort the crane operator's vision, especially when he is lowering a load. Crane operators should have their vision checked periodically; every six months has been suggested.
3. The crane should be taken out of service and tagged to indicate that it is out of service. The main control switches should be opened and locked out. The maintenance man doing the actual work on the crane way should carry the key.
4. Yes. This should be part of any well-organized safety program. A well-organized safety program will have training periods for all employees. Hookers should be trained as to the safe way of doing their job the same as any other new employee. They should be given this training at regular intervals to keep them safety conscious.
5. Many companies have preliminary, thorough training for prospective cranemen as well as operating cranemen. In some cases, before a craneman can operate a crane he must be certified to the effect that he can operate any crane in the plant.

The prospective craneman is given a thorough physical examination and a careful check on vision before he starts his training. Faulty vision must be corrected at this time. Standards of vision for cranemen must be established and if this standard is not met, the candidate cannot become a craneman.

Actual on-the-job training is then started, usually on a crane that is located in a yard or in some operation where it is not necessary to operate at full capacity. This training generally lasts about a week. The prospective craneman is then assigned to a crane with an experienced operator for a few days.

6. In many locations in a plant, it is possible to build a stairway with a landing platform. This serves as a permanent location for leaving the crane when it is not in service and eliminates the necessity of having either operators or maintenance men climb ladders to gain access to the crane cab. In a situation such as this, a door is cut into the side of the cab for easy access. A rail guard or gate should be installed on a platform interlocked with the control system so that it may be closed when the crane moves away from the landing platform.
7. Yes. While there is not in all cases a silicosis hazard there is a possibility of the slinger operator being exposed to some very fine dust. The sand as received by the sand slinger generally contains moisture but due to the nature of the operation some of this sand becomes aerated and dry so that it will form a dusty atmosphere.
8. A person using a pressurized respirator helmet breathes and exhales air into the helmet which would tend to cause a hygienic hazard if the person had a respiratory disease, cold, etc. Each operator should be provided with a personal air supply respirator helmet and this should be cleaned and overhauled at the end of each shift. Ordinary soap and hot water at a temperature of 180 F will kill most forms of bacteria and germs which could be introduced to the helmet.
9. Filter type respirators are designed for protection against dust only. They do not provide any protection against toxic gases or vapors, neither do they supply oxygen. Therefore, they will not provide any protection in any location containing toxic gas vapor or an enclosed space that may possibly have a deficiency of oxygen. Any respirator used should be of the type approved by the U. S. Bureau of Mines.
10. Yes. Separate departments may conduct a safety contest to develop a plant-wide record that will be in competition with other similar plants. The contest helps to keep employees safety conscious.

Poster Tools

11. A poster campaign is one more tool which can be used to keep people aware of accident prevention. Specific posters for safe operations on specific jobs are available (National Safety Council) that can be used in appropriate departments. Also available are general safety posters that contain a theme for a certain time of the year, such as fire prevention during October or good housekeeping during the spring months.
12. Trucking gangways or aisles should be marked off and designed to allow clearance for the specific trucking equipment using them. This is generally taken as twice the width of the truck. Naturally, consideration must be given to additional width needed to allow for pedestrians. Where molten metal is carried the width should be generally twice the width of the ladle. For additional information, refer to the AFS book *Safety Practice for Protection of Workers in Foundries.*
13. The operator should never be allowed to ride the load as he does not have full control of the vehicle. All work-saver operators should be trained and certified as to their ability to operate a work-saver safely before being allowed on a job.

Cable Maintenance

14. Cables should be examined constantly to prevent kinks and to detect frayed strands and weakening of splices. One frayed strand can cause an accident. Cables, especially those on cranes where they are wound and unwound, should be replaced at frequent intervals, depending on the application.

It is important that the cable diameter be proper for the diameter of the sheave or pulley on which it is used. Recommended diameters for sheaves and drums range from 27 to 72 times the diameter of the cable. In general, use the largest sheave or drum possible; the less flexible the cable, the larger the sheave should be. Thus, for a 6 x 7 cable, tread diameter of the sheave should be 72 times the cable diameter; for a 6 x 37 cable the figure is 27.

Employees should be taught the value of proper care of all cables and slings used throughout the plant and the importance of observing all recommended safety precautions. This procedure should be standard practice.

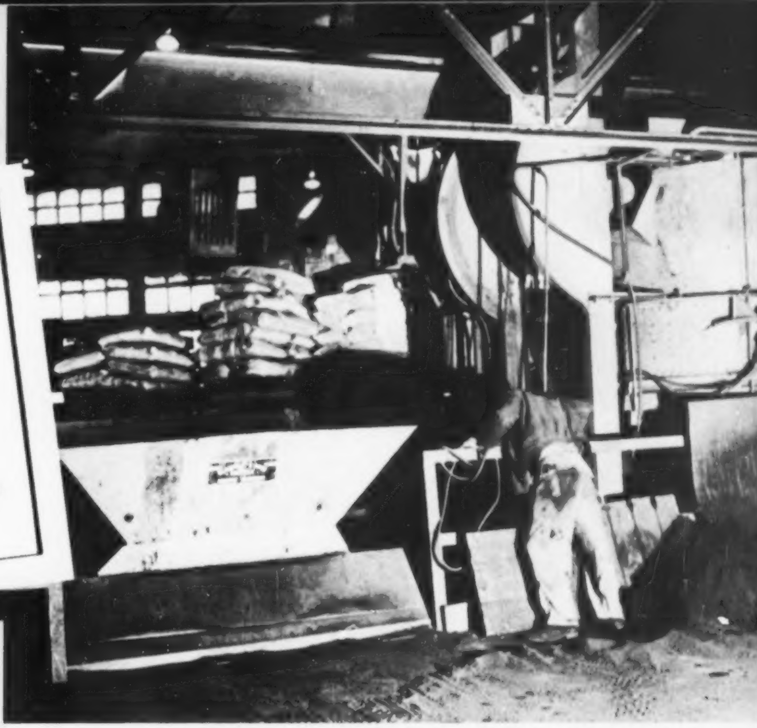
15. During 1950, in a plant maintaining a safety recommendation and suggestions program, 271 recommendations or suggestions concerning safety, hygiene and housekeeping were turned in by the employees. In 1951 there were 582, and in 1952 729 suggestions were received. Each year there is increased participation. When people think in terms of safety, you have the foundation of a successful safety program. Such employee participation in a safety suggestion program indicates that it is definitely worthwhile.
16. Safety is important for its own sake, and it also pays extra dividends. Personal discomfort . . . disability . . . family hardships . . . loss of earnings . . . reduced savings . . . are reasons enough for an active accident prevention program.

There are many other reasons: 1) The employer has a moral obligation to help safeguard employees; 2) Accident prevention helps to maintain output levels by keeping a man on the job; 3) Substitute men are often wasteful and inexperienced and it takes time to train them; 4) Reduced payments for workmen's compensation and sickness benefits; 5) Eliminates fears that

continued on page 94

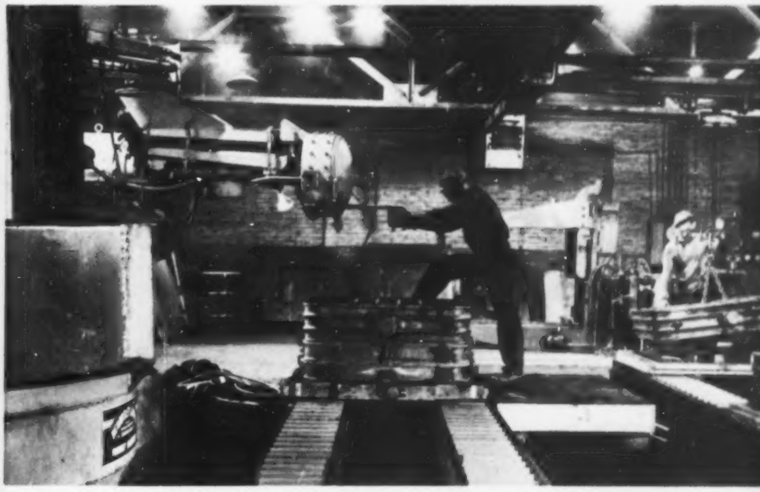
450 tons of sand...

conditioned, mulled and cooled each night at Peerless Foundry Co., Cincinnati

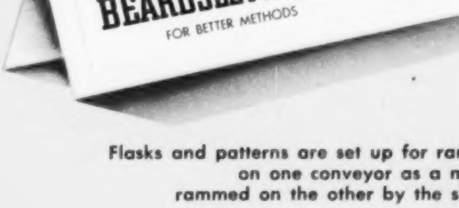


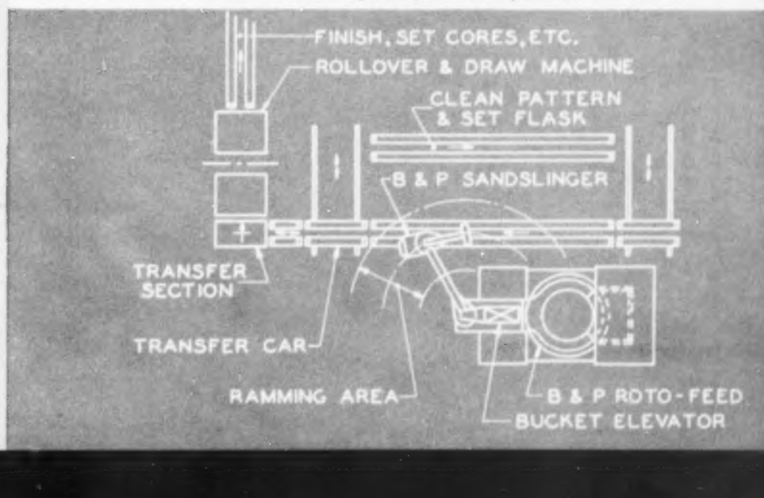
All molding sand in the foundry—over 450 tons every night--is completely conditioned, mulled, and cooled in this one Speedmullor-Preparator Unit, a key factor in the greatly increased production achieved by Peerless.

ONE SPEEDMULLOR-PREPARATOR UNIT handles all molding sand in the foundry . . . over 450 tons per night, every night! Sand is completely conditioned, mulled, and cooled in one-ton batches in 67-second cycles. The tripled capacity made possible for Peerless by the Speedmullor-Preparator and a Stationary Sandslinger Molding Unit has widened the range of this foundry's work, in addition to making production more profitable and efficient. Let us send you a copy of BETTER METHODS with the full story on Peerless as written by its president, Stephen Dana. Write today to Beardsley & Piper, Division Pettibone Mulliken Corporation, 2424 N. Cicero Avenue, Chicago 39, Ill.



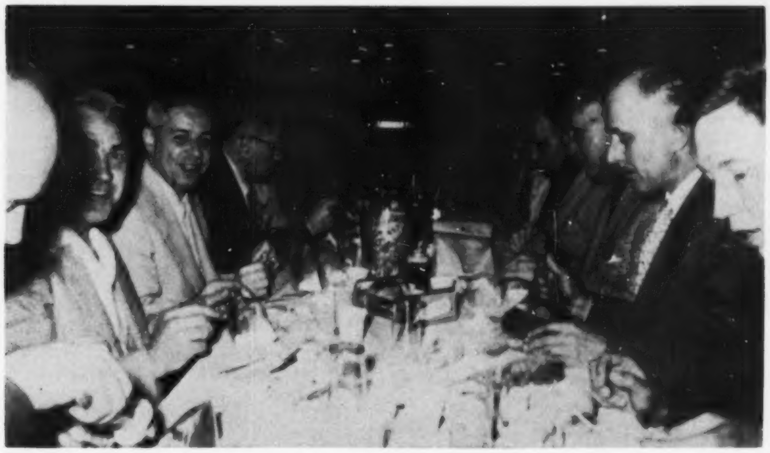
The Peerless Foundry slinger molding unit combines layout ingenuity with the proper selection of equipment. Separate flask set-up conveyor and ramming conveyor, joined by transfer sections, provide ample flexibility for handling many different patterns.





Flasks and patterns are set up for ramming on one conveyor as a mold is rammed on the other by the slinger.

Chapter News



Shown above are some of the members and guests who braved the weather to attend the Central New York Chapter's Annual Clambake at Binghamton, N. Y.

Frank Ceck, left, receiving a watch for outstanding service from John F. Roth at Northeastern Ohio Chapter's Old Timers Night.

Mo-Kan Chapter

C. W. Boettcher
Black, Sivalls & Bryson, Inc.

The last meeting of the Mo-Kan Chapter, before the summer, was held at the Fairfax Airport dining room, Kansas City, Mo.

J. Schumacher, chief engineer, Hill & Griffith Co., was the guest speaker and his subject was, "Foolproof Sand Works for Wide Range of Castings."

The following officers and directors were elected for the coming year:

Chairman: Wm. N. Chivvis, *National Lead.*

Vice-Chairman: Lloyd Canfield, *Canfield Foundry & Equipment.*

Treasurer: Herman Schwickrath, *Prier Brass Co.*

Secretary: Howard Julian, *Blue Valley Foundry.*

Directors: John Redman, Jr., *Redman Pattern Works;* Henry Deterding, *Sonken Galamba Corp.;* R. A. Posch, *Arpocalloy Co.;* Thomas F. Shadwick, *Witte Engine Works,* and C. W. Boettcher, *Black, Sivalls & Bryson, Inc.*

Central New York Chapter

Harold R. Brakeman
City Pattern Shop

One hundred and fifty members and guests of the Central New York Chapter braved the threatening weather to go to Binghamton, N. Y. for their annual clambake. This long awaited event was held at Mountain Top Grove and in spite of cold and rain, was termed a success.

★ Target is 12,000

A target of 12,000 members by June 30, 1954, was set at the Chapter Officers Conference held May 18-19, at the Sherman Hotel, Chicago. Active membership in the Society as of July 17, was 11,105. It is felt with continuing effort of the part of all chapter committee men and membership workers, this goal will be reached early in the year.

Michigan State College

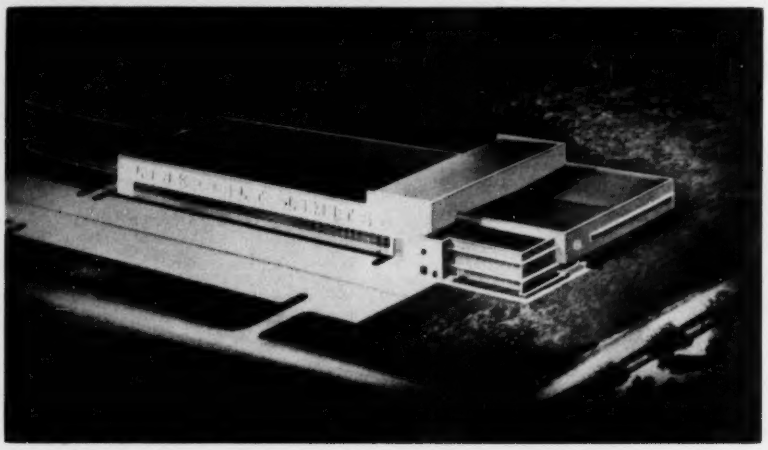
Thomas G. Thomas

Approximately 100 foundrymen attended the Fifth Annual Student Indus-

continued on page 96

Enjoying a pause at the Central Illinois Chapters' Old Time Barbecue are from left to right: George E. Garvey, vice-president, City Pattern & Foundry, South Bend, Ind.; Fred Wack, president, Central Pattern Co., St. Louis; Rudy Nimitz, shop foreman, City Pattern & Foundry, South Bend, Ind.; Otto Arneson, president, Arneson Pattern Co., St. Louis; Clayton Russel, purchasing agent, Caterpillar Tractor Co., Joliet, Ill.; Frank O'Klesson, manager, Motor Patterns Co., Cleveland, and Jack Parker, manager, Motor Patterns Co., Cleveland.

Foundry Tradenews



New Link-Belt plant at Scarboro, Ont., where company recently hosted civic leaders, engineers and industrialists. The plant is located on Canada's "Golden Mile of Industry," about 10 miles from downtown Toronto. New plant will design and manufacture conveying and processing equipment.

Carl E. Rowe & Co., who recently moved to the Industrial Mart Bldg., Milwaukee, have not reorganized as stated previously in these columns. The move to larger quarters was made in order to expand their staff and to offer a more complete service.

N. Ransohoff, Inc., producer of equipment for surface treatment of metals, recently moved from Elmwood, suburb of Cincinnati, to a larger, completely modern plant in Hamilton, Ohio. An expansive fabrication shop with a pillarless interior is one of the important features of the new plant. The change of address has caused no change in key personnel.

Alloy Rods Co., York, Pa., has started construction on a new plant at El Segundo, Calif. The site is near the Los Angeles International Airport, in the new industrial area now being developed by the **Santa Fe Railroad.** The new plant, to be known as the **Pacific Coast Div.** of **Alloy Rods Co.,** will produce a complete line of alloy arc welding electrodes. It is expected to be in full operation by October 1, and will service the entire Pacific Coast and Rocky Mountain States. The company's plant at York, Pa., is being enlarged to double existing production facilities.

Falcon Bronze Co., Youngstown, Ohio, has been sold to **American Brake Shoe Co.,** New York. As a result of the CIO United Steelworkers strike, which closed the plant March 12, stockholders of Falcon voted to go out of business. Plant equipment for the manufacture of bronze, copper, and aluminum castings is to be moved to American Brake Shoe plants throughout the country.

Automatic Control and **Uni-Flo Divs.** of **Barber-Colman Co.** have opened two new factory branch offices, one in Syracuse, N. Y., the other in Jacksonville, Fla. Manager of the Syracuse office, located at 218 Harrison St., is K. C. Watson. D. W. Minick will manage the Jacksonville office located at 1143 Mary St.

Thor Power Tool Co., Aurora, Ill. will open a new sales and service factory branch office in Atlanta, October 1. The company's new sales office in Newark, N. J. was opened early in July, and the removal of its Buffalo, N. Y., branch into a new building was completed May 8.

Ruco Sales Corp., newly formed Chicago shell molding consultants and distributors of shell molding machines, parts and accessories, have secured a franchise for the sale, in their area, of the Shalco shell molding machine developed by Professor Frank K. Shallenberger of Stanford University and manufactured by his company, **Shalco Engineering Corp.,** Palo Alto, Calif.

George J. Hagan Co., Pittsburgh, Pa., is furnishing the forging furnaces for **U. S. Hoffman Machinery Corp's.** huge shell plant in Scranton, Pa. The equipment to be furnished includes two 30 ft rotary hearth furnaces, four 36 ft rotary hearth furnaces, and four manipulators.

Lithium Corporation of America, Inc. is liquidating its wholly owned subsidiary **Metalloy Corp.** Metalloy previously operated as the chemical and sales division of the parent company. Hereafter, all business will be conducted under the name of Lithium Corporation of America, Inc.

American Ventilating Hose Co., a division of **Callahan Zinc-Lead Company, Inc.,** is changing its name to the Flexaust Co. The company is making the name change to better identify itself with its products.

Electro Metallurgical Co., a division of **Union Carbide & Carbon Corp.,** New York, has expanded to meet the increasing demand for medium-carbon ferromanganese. The company's new plant in Alloy, W. Va., is expected to double their capacity for producing this special grade of ferromanganese.

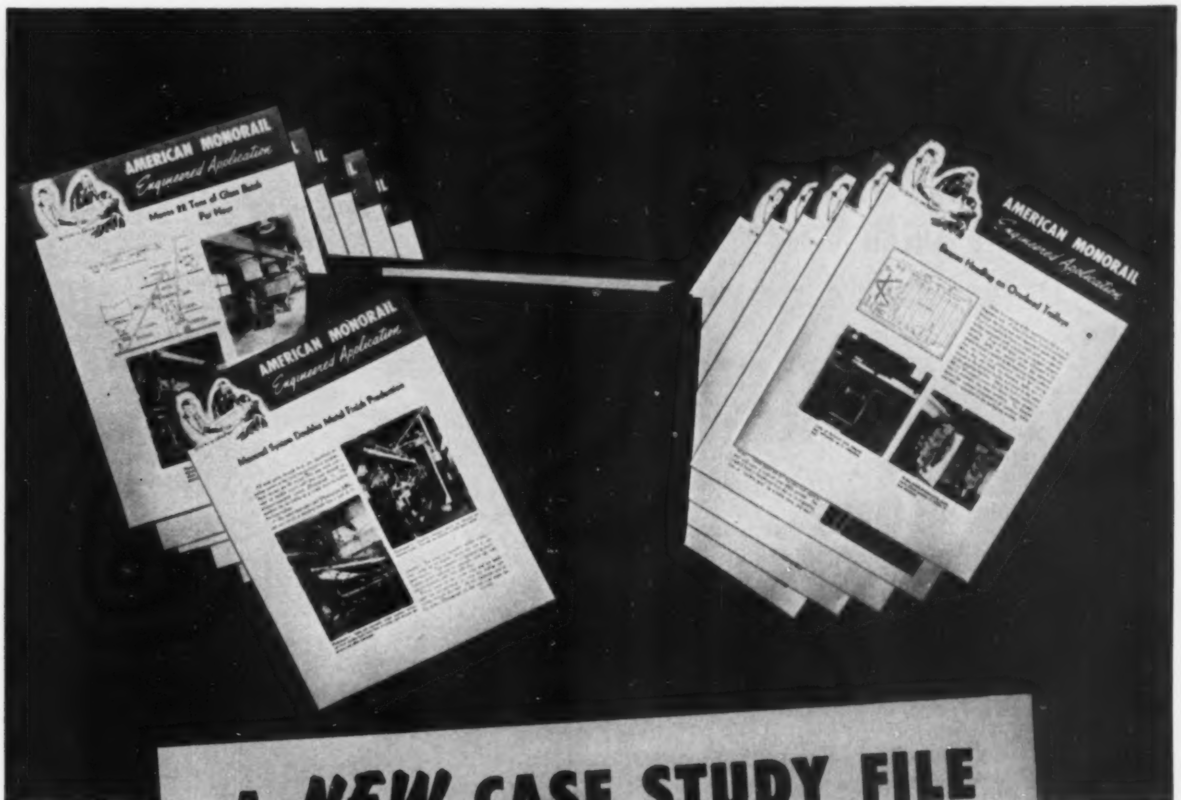
Carbon Malleable Casting Company, Inc., Lancaster, Pa., as part of its building program, has changed its name to **Pennsylvania Malleable Iron Corp.** The expansion program was begun in 1948. Since that time, the company has spent about $250,000 on new equipment for molding, annealing, melting, and cleaning of castings. Production was also begun on a new line of marine hardware, in addition to their regular production of made-to-order castings.

Cleveland Flux Co., manufacturers of Cornell Flux, has appointed George F. Pettinos (Canada) Ltd., Hamilton Ont., sole representative for Ontario and Manitoba.

Newest facility in **Norton Behr-Manning Overseas Inc.'s** group of foreign plants was dedicated in Belfast, Ireland last month. The new plant, **Behr-Manning Ltd.,** is equipped to manufacture coated abrasive papers and cloth.

The Girdler Corp. has merged with **National Cylinder Gas Co.** Girdler Co., now a division of National Cylinder, will continue operations from its principal business office in Louisville. Votator, Gas Processes and Termex divisions will retain their identities as divisions of the Girdler Co.

A transformer room explosion destroyed part of the main foundry building at **Electric Steel Foundry Co.,** Portland, Ore. That blast came without warning as a new heat was started in the furnace. It was thought that a large oil switch for the 11,000 volt transformer exploded from collected gas fumes. The high steel doors of the transformer room were blown off by the force of the explosion, which blew out most of the north wall of the building and the No. 1 furnace, which produces about 60% of total foundry tonnage, was out of production for 45 hours.



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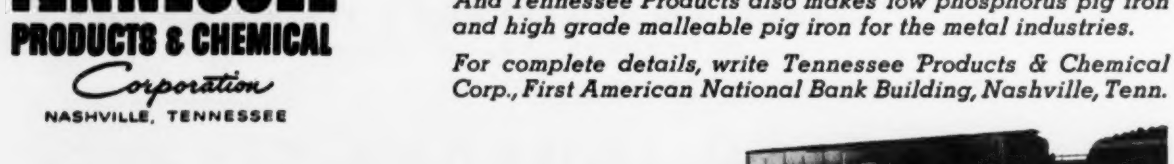

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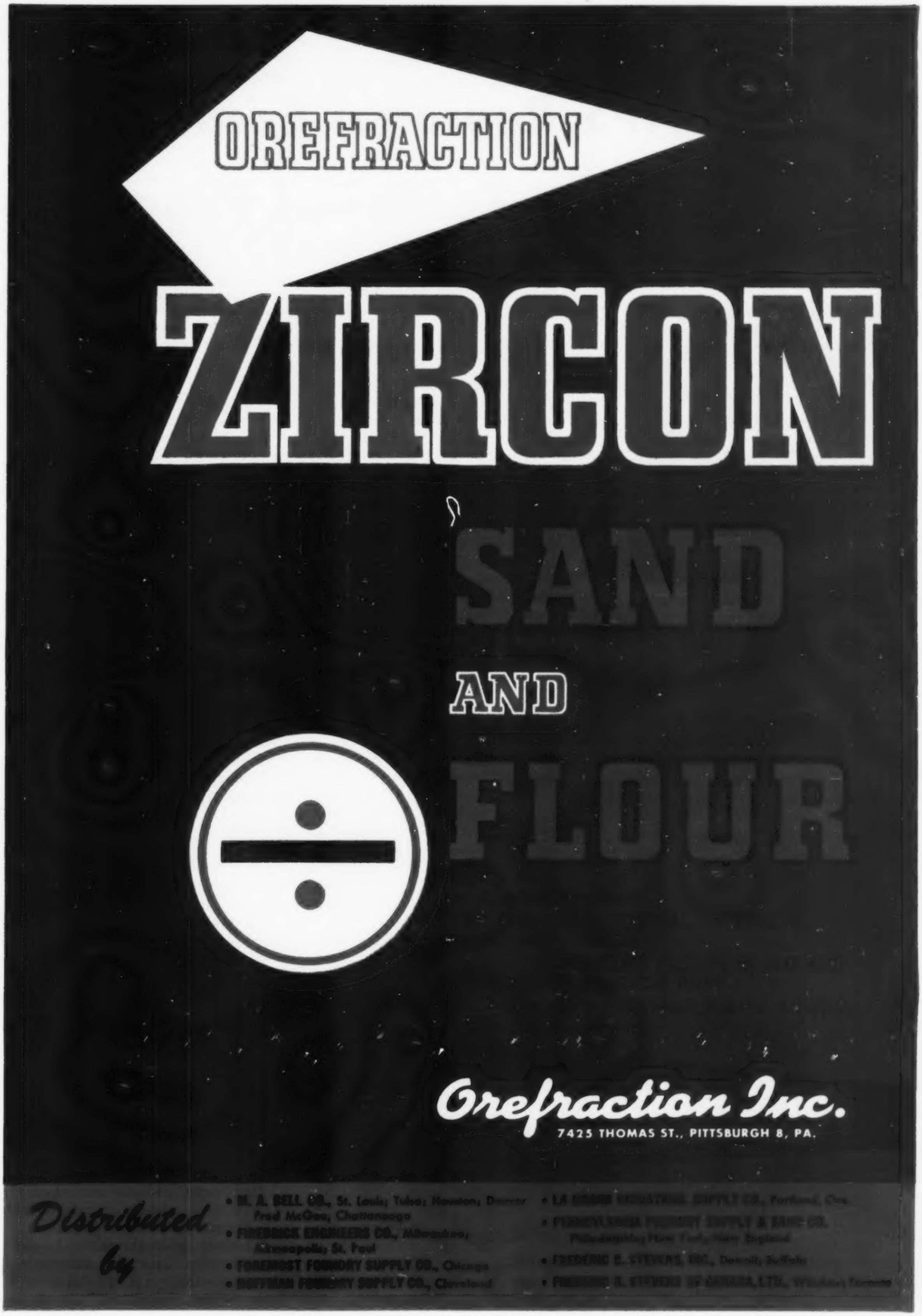
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AFS Regional Conferences Plan Technical Programs

F. J. Dost . . . Niagara Speaker

Niagara Frontier Regional

The Niagara Frontier Regional Conference will be held on September 17-18, 1953 at the Statler Hotel, Buffalo, N. Y. General conference chairman is Grant S. Diamond, Electro Refractories & Abrasives Corp., Buffalo, N. Y. Co-Chairmen are: Carl A. Harmon, Hanna Furnace Corp., Buffalo, N. Y.; and Henry Sproulle, A. P. Green Firebrick Co., Buffalo, N. Y.

The conference will have an international aspect, since Ontario will be one of the participating chapters. Other sponsoring chapters are: Western New York, Northwestern Pennsylvania, Rochester, Central New York, and Eastern New York.

The program for the conference is listed below. It is subject to last-minute revision before the sessions convene.

September 17, 1953

8:30 am: Registration Opens
9:30-9:45 am: Welcoming Addresses, general chairman and participating officers
9:45-11:30 am: Shell Molding Panel—"C" Process
Speaker: B. N. Ames, New York Naval Shipyard
Chairman: Ezra Kotzin, Curtiss Wright Corp.
Co-Chairmen: A. J. Bzdula, General Electric Co.; A. J. Marotta, Utica Radiator Corp.; Ray Olson, Production Foundry & Pattern Co.; Dr. J. C. Searer, Durez Plastics & Chem. Co.
12:15-2 pm: Luncheon
Speaker: F. J. Dost, Vice-President, American Foundrymen's Society.
Speaker: T. E. Barlow, Eastern Clay Prod. Dept., International Minerals & Chemical Corp., Chicago, *"Pressure Molding."*
2:15-3:30 pm: Sectional Meetings
Gray Iron: H. H. Wilder, Vanadium Corp. of America
Non-Ferrous: J. S. Vanick, International Nickel Co.
Pattern Practice: A. F. Pfeiffer, Allis-Chalmers Mfg. Co.
Steel: Thomas Armstrong, International Nickel Co.
3:45-5 pm: Sectional Meetings
Gray Iron: speaker to be announced.
Non-Ferrous: H. F. Taylor, Mass. Inst. of Technology.
Pattern Practice: J. M. Kreiner, National Malleable & Steel Castings Co., *"Patterns for Malleable and Steel Foundries."*
7 pm: Banquet
Speaker: Ralph L. Lee, General Motors Corp., Detroit: *"Foundry People as They Come and Are."* Another speaker to be announced.

September 18, 1953

8:30 am: Registration Opens
9-10 am: Educational
Speakers: Prof. P. E. Kyle, Cornell University; and Otto Guenther, Inst. of Applied Arts & Sciences, New York.
10-12 am: Shell Molding—"D" Process
Speaker: F. S. Brewster, Harry W. Dietert Co., Detroit.
12:15-2 pm: Luncheon
Speaker: C. V. Nass, Beardsley & Piper Div., Pettibone Mulliken Corp., Chicago: *"Mechanization of Molding."*
2:15-3:30 pm: Sectional Meetings
Gray Iron: J. E. Rehder, Canada Iron Foundries, Ltd.
Non-Ferrous: H. H. Fairfield, Wm. Kennedy & Sons, Ltd.
Steel: C. B. Jenni, General Steel Castings Co.
Malleable: F. B. Rote, Albion Malleable Iron Co.
3:45-5 pm: General Meeting: Foundry Sands
Speaker: C. A. Sanders, American Colloid Co.

Ohio Regional

The sixth Ohio Regional Conference is scheduled for Cincinnati's Netherland Plaza Hotel on September 24 and 25, 1953. "Engineered Castings" will be the general theme for the meetings.

William L. Oberhelman, Oberhelman-Ritter Foundry Co., Cincinnati, will be general chairman. Participating AFS chapters are: Cincinnati, Northeastern Ohio, Central Ohio, Canton, and Toledo.

Registration will begin at 9 am, Thursday, September 24. The general session follows, from 10 am to noon. A luncheon will be held on Thursday, with the speaker and subject to be announced later.

Following the luncheon, four sessions will be held from 2-3:15 pm: Malleable, Gray Iron, Non-Ferrous and Steel. After a recess, the sessions will continue from 3:30-5:30 pm, with different speakers. At 6 pm on Thursday, the conference dinner will be held. Speaker will be Edward A. McFaul of Midwest Institute, Chicago. A second speaker has not been selected as yet.

The conference will convene on Friday, September 25, at 9 am. Sessions are scheduled for the subjects covered on the first day, with Safety, Hygiene, and Air Pollution added. The sessions will continue from 10:30 am to noon, following a short intermission.

The Friday luncheon will feature an address by a national officer of American Foundrymen's Society, and will be followed by a general combined session. Plans have been made to close the conference promptly at 3:30 pm to expedite travel for members in attendance.

Abstracts

Abstracts below have been prepared by Research Information Service of The John Crerar Library, 86 East Randolph Street, Chicago 1, Ill. For photoduplication of any of the articles abstracted below, write to Photoduplication Service at the above address, identifying articles fully, and enclosing check for prepayment. Each article of ten pages or fraction thereof is $1.40, including postage. Articles over ten pages are an additional $1.40 for each ten pages. A substantial saving is offered by purchase of coupons in advance. For a brochure describing Crerar's library research service, write to Research Information Service.

■ A305 . . "Degree of Combustion in Cupola Furnaces," Wolfgang von Preen, *Gjuteriet*, vol. 43, no. 2, February 1953, pp. 25-28 (in Swedish).

The degree of combustion is measured by the ratio of the volume of CO_2 to the sum of volumes of CO_2 and CO formed when a given quantity of coke of a certain C content is burned in the furnace. This ratio can be expressed as a function of various thermochemical factors entering into a consumption of the heat balance sheet of the melting process, such as the temperature of the exhaust gases and that of the blast air, chemical energy liberated and that carried away with the gases, etc. The expression so obtained can be used for calculations in the practical control of the furnace.

■ A306 . . "Boudouard's Equilibrium in Cupola Furnaces and the Influence of the Shaft Height," W. V. Preen, *Giesserei*, vol. 40, no. 6, March 1953, pp. 141-144 (in German).

Boudouard's equilibrium

$$(K_{pB} = \frac{p^2_{CO}}{p_{CO_2}})$$

can be used for the determination of the composition of furnace gas of cupola furnaces. Since this equilibrium is dependent on temperature, the composition will be changed by all factors which influence the temperature in the sphere of reaction. Large heat losses at high temperatures of the furnace gas are compensated to some extent by lowering the reaction temperature through the introduction of the stock into the sphere of reaction in a less preheated state, thus increasing the carbon dioxide content of the gas and also the combustion efficiency. The best operational results from a heat economical point of view can be achieved if the heat of the rising gas in a high furnace shaft is extensively utilized for the preheating of the descending stock and keeping the reaction temperature at the proper temperature by suitable furnace practices.

■ A307 . . "The Micrographic Appearance of Spherulites of Graphite," A. De Sy, J. Vidts and G. Vandermeersche, *La Fonderie Belge*, vol. 1, January 1953, pp. 14-18 (in French).

All students of spherulitic graphite have remarked about the polarizing power of the specimens studied and of the nucleus, often white in color, which appears in the center of the crystal. The different opinions on these aspects are undoubtedly due to the degree of polish and finish on the specimen used. The authors have studied spherulites of graphite insofar as the finish and polish affect the appearance as determined by optical and electronic microscopes. Techniques of polishing and polishing agents are described. The authors deny the existence of any marked nucleus on the basis of their studies. Micrographs illustrate their findings.

■ A308 . . "Magnesium Casting Alloys Containing Zirconium," F. P. Streiter, *Metal Progress*, vol. 63, no. 3, March 1953, pp. 75-82.

Three commercially developed magnesium-zirconium systems are: magnesium-rare earth-zirconium, magnesium-thorium-zirconium and magnesium-zinc-zirconium. Rare earths, often added as mischmetal, are usually present to the extent of 3 per cent, the amount of zirconium varying. Mg-RE-Zr alloys have good high temperature creep resistance.

Mg-Th-Zr alloys show good high temperature mechanical properties. Sample castings of jet parts have been made. The zinc system has aroused controversy over its service-ability. One such alloy has good yield strength and elongation, can be sand-cast, and is useful for aircraft landing wheels.

Compositions and properties are tabulated for each of these systems.

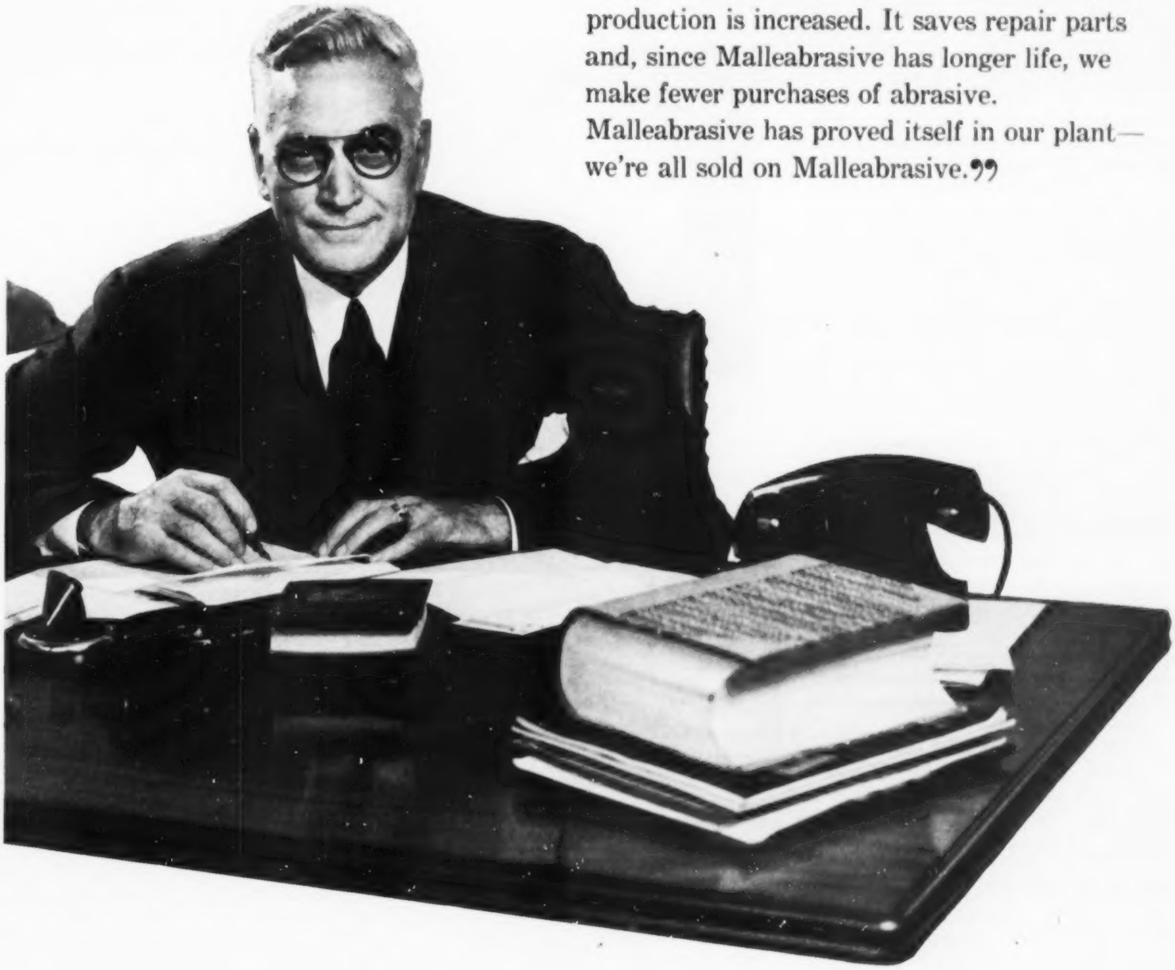
■ A309 . . "Observations of a Manufacturer of Spherulitic Cast Iron," H. Gries, *Giesserei*, vol. 40, no. 4, pp. 93-103, February 1953 (in German).

Using iron with rather low Si content (0.8-1.5%) the author obtains white castings that, upon annealing, develop considerable secondary spherulitic graphite. Through varying the temperature and the duration of the annealing process, a number of products of well defined properties are obtained.

The average Mg content in these products is 0.05-0.06 per cent, while that of Si is 0.012 per cent. Some of the graphite, both primary and secondary, is present in forms other than spheroidal; it can be more or less flocculent or lamellar. The laddle used in the process contains a chamber into which the Mg alloy is placed; the speed of the latter's reaction with iron is regulated by lifting or lowering the lid of the chamber by outside control.

Paul Arnold, U.S. Pipe & Foundry Co. (left); S. C. Massari, former AFS Technical Director, now general manager Foundry Division, Hansel-Elcock Co., and Howard Barker, U.S. Pipe and Foundry Co., gather at meeting of Tennessee Chapter.

"Keeping costs down in a large operation is a difficult job. Our cleaning room superintendent suggested that one economy might be using Malleabrasive in our blast cleaning machines. We tried it—and were delighted! Malleabrasive saves us money in many ways. It does a quality cleaning job on all kinds of work. It cleans faster and cuts down-time, so production is increased. It saves repair parts and, since Malleabrasive has longer life, we make fewer purchases of abrasive. Malleabrasive has proved itself in our plant—we're all sold on Malleabrasive."



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AFS Issues Last Call For Paris Foundry Congress

NEARLY 150 American foundrymen and their wives are expected to attend the 1953 International Foundry Congress, September 20-26, in Paris, France, under sponsorship of the Association Technique de Fonderie de France. One-half of the expected delegation will travel on the several tours arranged by AFS to include the week of the International, visits to Italy, Switzerland, Belgium, Netherlands, and England, and inspections of a number of outstanding European foundries.

The American delegation will be headed by AFS past President L. N. Shannon, Vice-President of Stockham Valves and Fittings, Inc., Birmingham, Ala. as the elected President of the International Committee of Foundry Technical Associations. Mr. Shannon has been invited to address the official general opening session at the famous Sorbonne of Paris University on Monday, September 21, which it is hoped will be attended by the entire American delegation. Mr. Shannon will also preside at the meeting of the International Committee of Foundry Technical Associations on Thursday, September 24.

The afternoon of the closing day, Saturday, September 26, Mr. Shannon again will be honored by the French Association, at the formal closing session in the Sorbonne, by the awarding of a "Great Medal of Honor," which has previously been awarded to only half a dozen persons. The Medal is being awarded to him for "the services rendered to foundrymen on an international scale, to French foundry practice, as President of the 1952 International Congress in Atlantic City, and as President of the International Committee this year."

A second medal of honor will be awarded at the same time to Pierre Chevenard, past President and Honorary President of the French Foundry Association and member of the Institute of France. The Congress will close with a formal banquet and ball the evening of September 26th.

M. P. Muguet, President of the Association Technique de Fonderie de France, will preside during the Congress itself, which is held under the patronage of the President of France, the Prime Minister and the President of the Council of the Republic, as well as the International Committee of Foundry Technical Associations. Thus the Congress will be an important industrial event in France and to all European foundrymen as well as AFS.

L. N. Shannon . . . heads delegation

In addition to the official program for the Congress shown below, the French Association has courteously arranged a number of special events for the American delegation.

1953 International Foundry Congress

Saturday, Sept. 19

Registration 10 am-12, 2-6 pm.

Reception 5-8 pm by French Association for all participants.

Sunday, Sept. 20

All-day excursion for participants, leaving in late morning for Castle Dam Pierre on outskirts of Paris; luncheon, tour of Castle and its park, garden party.

Monday, Sept. 21

Official opening session in great Amphitheater of the Sorbonne. 12:30 pm—participants and ladies lunch together. Afternoon—technical sessions. Afternoon tour of Paris for the ladies, and tea.

5:30 pm—official reception by Municipal Council of the City of Paris at Hotel de Ville. 8:30 pm—dinner and cabaret program.

Tuesday, Sept. 22

Morning—Technical sessions (technical training). Visit to foundry Bruneau (light metal alloys) at Orleans (75 mi. from Paris.) Other activities for the ladies. Noon—members and ladies lunch together.

Afternoon—Technical sessions.

Afternoon—Visit to Gailly Bros. foundry (Malleable castings) at Meung, returning through Chartres to visit one of the most beautiful Gothic Cathedrals in France. For the ladies, a river cruise on the Seine with tea at Eiffel Tower.

Wednesday, Sept. 23

Morning—visits to light metal foundries in Paris and suburbs. For the ladies, a trip to the outskirts of Paris and luncheon, returning to Paris for dinner. Noon—Congress registrants lunch together.

Afternoon—Technical sessions (graphitization in cast iron, furnaces and refractories, foundry defects.) Visit to Bonvillaine at Roncery (gray iron) at Choisy le Roi, or to the bronze foundry of Codari et Dubur at Poissy.

Thursday, Sept. 24

Morning—Visit to the Castle of Chantilly (30 mi. N. of Paris). Visits to foundries in Paris. For the ladies, visits to the famous shops of Paris. Noon—Members and ladies lunch together.

Afternoon—Technical sessions (spheroidal cast iron, laboratory and metallurgical problems, testing methods.) Visit to the important foundry Montupet (light metals) at Nogent sur Oise, returning for official reception. For the ladies, a mannequin style show of dresses, furs, millinery.

6 pm—Reception by the Chamber of Commerce of Paris.

Friday, Sept. 25

Morning—Technical sessions (cast iron, melting enameling alloys; mold and core sands, time and labor economies.) Excursions to St. Germain and visit to the foundry Cromback (malleable iron). Noon—luncheon for Congressites. For the ladies, excursion and luncheon in neighborhood of Paris, returning in time for reception.

Afternoon—Visit to the laboratories of the Technical Center of the Foundry Industires and the National Association of Porcelain Manufacturers.

5:30 pm—Reception at Sevres by Foundry Technical Center.

9 pm—Visit to the Flood-lit galleries of the Louvre.

Saturday, Sept. 26

Morning—Technical sessions (safety, hygiene and working conditions; light alloys, copper alloys, non-destructive testing.) Free for the ladies, all members and ladies lunching together at noon.

Open for American delegation, with a possibility of visiting Legensel and Blanchard plant (centrifugal casting of steel).

Afternoon—Formal closing session at the Sorbonne, awards of medals by the French Association, and the International Award of Honor.

8 pm—Final banquet and ball (evening dress).

As a regular part of the Congress, conducted motor coach tours will take place September 28 to October 4 inclusive, under auspices of the French Association. These study tours will be in deluxe "pullman buses" and four separate trips have been arranged, each visiting foundries, castles, historic

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Paris Tour

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places, and scenic attractions in separate sections of France as follows:

Tour No. 1—To the Loire Valley, Britain and Normandie.

Tour No. 2—To the Savoye, Dauphine and Provence. Includes Avalon, Aix-Les-Baines, Grenoble, Valence, Orange, Point du Gard, Aix-en-Provence, Marseille, back to Paris.

Tour No. 3—To Alsace and Lorraine. Includes Colmar, Strassbourg, Metz, Luxembourg, Verdun, Rheims, and back to Paris.

Tour No. 4—To North France and the Ardennes. Includes Beauvais, Boulogne, Lille, Valenciennes, Maubeuge, Charleville and Rheims, returning to Paris.

AFS has received from the French Association the membership and subscription forms which all attending the Congress are requested to fill out and return to France promptly. This is required for those intending to take the post-Congress tours, since at least 25 persons must guarantee attendance in order for the tours to be held. The application forms are also requested for those intending to visit various plants. Participation tickets for plant tours will be presented at the office of the Congress in Paris, 2 Rue de Bassano, Paris 16.

Registration fees for all-inclusive attendance at the official Congress functions will be 21,500 French francs (approx. $61.55) for men and 23,300 francs ($66.70) for ladies. These fees will apply for American participants since AFS is a member of the International association. Registration fee for the Congress alone will be 5000 francs ($14.31) for men and 2000 francs ($5.73) for ladies, with additional fees for a number of the various events arranged.

In addition to arrangements made by the French, the Institute of British Foundrymen have made special arrangements for entertaining American foundrymen visiting the United Kingdom, covering particularly participants on Tours A and D. These arrangements for Tour A include the following: Oct. 27— Trip to the Midlands and Birmingham by train, coach excursion to Shakespearean country, evening in Birmingham; Oct. 28—Plant visits in Birmingham, returning to London by train; Oct. 31—Plant visits in London area. October 26, 29, 30—Open.

Arrangements for those accompanying Tour D will include the following: Oct. 25, 29—Open; Oct. 26—Plant visits in London area; Oct. 27-28—Two-day trip to Shakespearean country and the Midlands.

Letter has been received from the Swiss Foundry Association who have arranged four excursions for October 14 and 15, on the itinerary of Tour D. These excursions include the plants of (1) George Fischer, Ltd. at Schaffhausen (steel, malleable, gray iron, fittings, light alloy castings, wheels, textile castings, woodworking machines, machine tools, foundry equipment); (2) the Rolled Iron Works of Kleus near Balsthal (gray iron, machine tool casting, soil pipe, bath tubs, hand and machine molding); (3) Escher Wyss, Ltd., Zurich (gray iron, water turbines, steel turbines); Oerlikon Engineering Co., Zurich (gray iron, steel turbines, electric locomotives, generators, apparatus; (4) Rieter Textile Machine Works, Ltd., Winterthur (gray iron); Sulzer Bros., Ltd., Winterthur (gray iron steel, non-ferrous metals).

AFS is in communication with Italian, German and Dutch Foundry Associations as to available plants there, the names of which are not at present known. However it has been learned that the Annual Meeting of the German Foundrymen's Association will be held at Duesseldorf October 8-10 and will include several interesting plant visitations. In addition, the Syndicate General of the Mechanical and Metalworking Industries of France will hold the 5th International Congress at Turin, October 9-15, with the general topic of "Methods of Protection and Assembly of Parts and Mechanical Manufacture."

Reservations can still be made for the tours sponsored by AFS to the International Foundry Congress. These tours are available on an all-expense, all-inclusive basis or independent travellers may join the tours for any part of their stay in Europe. All reservations and arrangements are being handled through a North American Transportation Committee, Room 305, 500 Fifth Ave., New York.

Tour A (49 days, 38 days in Europe) sails from New York August 18 on the "Caronia," return sailing from Cherbourg on the "Queen Mary" October 1. Tour B (46 days, 35 days in Europe) sails from New York October 28 on the French line "Liberte," return sailing from Southampton October 6 on the "Ile de France." Tour D, which will carry the "official party" headed by International President L. N. Shannon (57 days, 45 days in Europe), sails from New York September 8 on the "Ile de France," return sailing from Southampton October 30 on the "Liberte."

These tours are all first class in nature and all-expense rates include steamship accommodations, land transportation in Europe, a cruise director throughout Europe, hotels with twin bedded rooms and bath, continental breakfasts and table d'hote dinners at hotels enroute except in London and Paris, motor coach sightseeing, baggage and personal transfers, and group gratuities. Minimum rate per person for Tour A is $1,387, $1,325 for Tour B, and $1,520 for Tour D.

Quizmaster

continued from page 74

develop when accidents occur frequently; 6) Results in better housekeeping, better care of equipment, and better quality.

Safety practices have long proven to be sound business.

17. During the induction of a new employee in one plant, the Safety & Employment Department spends about an hour and a half introducing to each new employee the shop rules, safety rules, sanitary rules, sanitary facility rules, the company benefit plans, and the safety programs.

Before starting to work on his first day, the new employee is taken to the First Aid Room and introduced to the company nurse. He is shown safety displays, unsafe tools displays, safety records, safety awards, safety suggestion boxes, safety color code, and given a complete outline of the company's safety and hygiene program.

The company wants the new employee to know it has a good safety program and that his help is needed to keep it good. He starts off on the right foot—thinking in terms of safety.

18. Success of such a program depends upon these factors reported by one plant:

1. Quick action on suggestions that can be handled on the spot.
2. Let man making suggestion know if time for consideration is required.
3. Let him know if nothing is going to be done—and why.

Suggestions that can be handled immediately by the Maintenance Department are done so on the authority of the safety director. Those requiring consideration are discussed at the Workmen and Foremen's Safety Committee meetings. The committee can authorize action or can refer a recommendation to higher authority. The minutes of these meetings are placed on bulletin boards where everyone can read what action was taken of the different suggestions or what other safety discussions took place.

1913

1953

40 years of service

This year City Pattern Foundry and Machine Company is celebrating its fortieth year in business; forty years that have marked many gratifying changes in our plant size and facilities. In 1913, we produced our first pattern in a small second story shop with a total complement of two employees. Today in one of the largest and best equipped plants in the industry our employees number close to three hundred.

However, one thing has *not* changed in forty years . . . that is our unvarying goal to produce the finest in pattern and machine work in the most efficient and economical manner possible.

To the many loyal companies who have made possible the City Pattern Foundry & Machine Company of 1953, we pledge continued efforts to constantly keep our skills and facilities abreast of their needs.

CITY PATTERN

FOUNDRY AND MACHINE CO.

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Claude B. Schneible, Claude B. Schneible Co., attending Old Timers Meeting of the Northeastern Ohio Chapter.

Chapter News

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trial Dinner, held at Kellogg Center, Michigan State College, June 6. The dinner, annually sponsored by the M. S. C. student chapter, is a project to familiarize foundry students with surrounding industrial personnel.

Collins L. Carter, AFS National President, spoke at the dinner and gave an interesting account of the growth of AFS student chapters and stated that the student groups are considered one of the most important phases of the national organization.

Verne Righter, industrial advisor to the chapter, showed two color films, one on shell molding procedure, and the other on the method used in mechanizing certain operations at the Saginaw Malleable Iron Co.

A. E. Rhoads, also an industrial advisor to the chapter, limited his remarks to the non-technical aspects of moral and character development needed by the engineer. He pointed out that more technical personnel were found unsatisfactory by industry because of personality conflicts than from technical inability.

Dean Lorin Miller, retiring Dean of Engineering at Michigan State College, was honored with a gift of bronze book ends cast and finished in the college foundry. The presentation was made by foundry instructor Ashley Sinnett.

A second set of book ends were presented retiring pattern instructor George Posthumus by Kenneth H. Priestley, Vassar Electroloy Products, Inc. Mr. Priestley was one of Mr. Posthumus' former students.

All attending the dinner were presented with a souvenir model cast aluminum cupola furnace, designed and cast by student chapter members.

Newly elected officers for the coming

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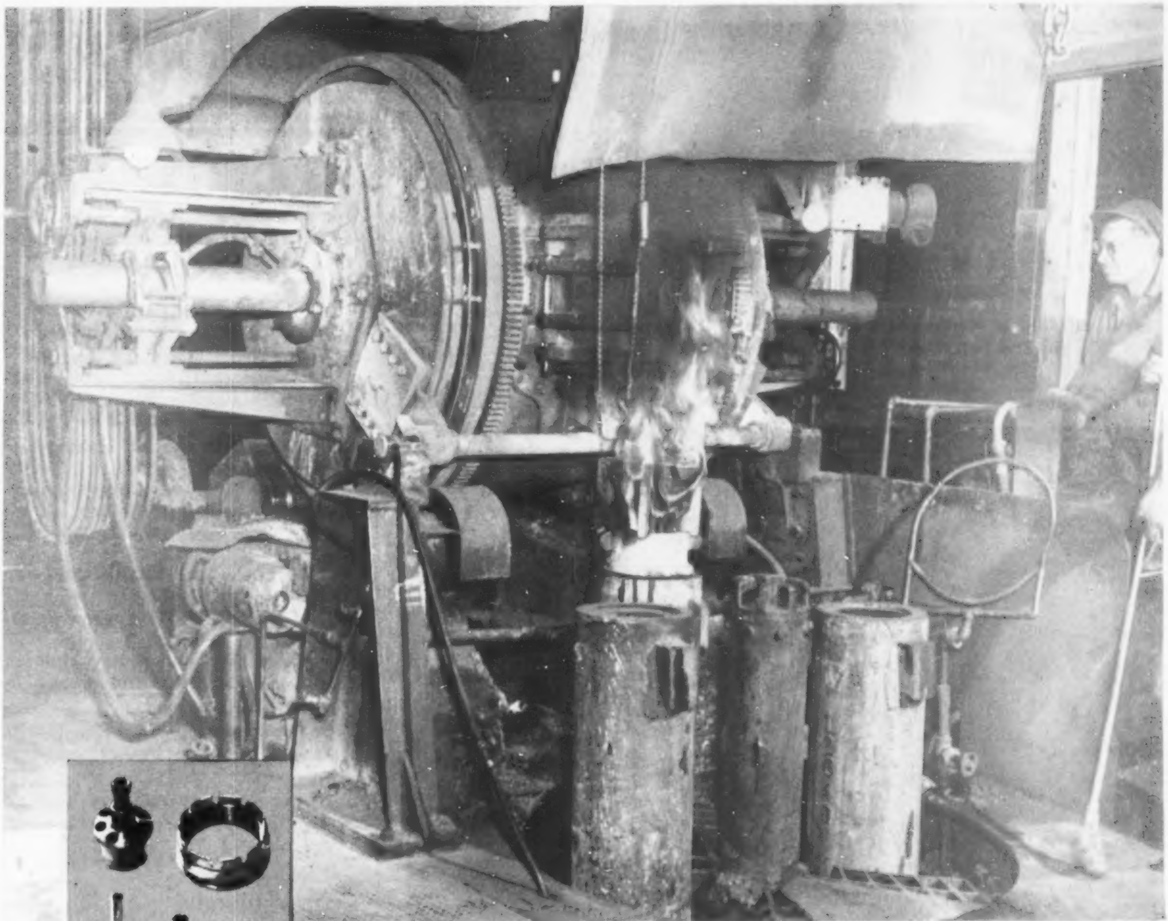

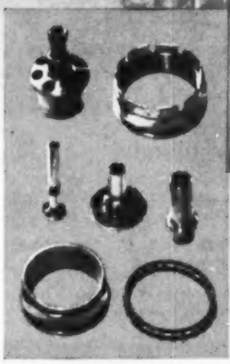

Some of Mueller Brass Company's products made from DEF-melted alloys.

11 tons of copper alloy billets from this furnace every 24 hours

In this nose-tilting, 1000-lb. capacity Detroit Rocking Electric Furnace at Mueller Brass Company, alloys are changed from heat to heat. Yet it melts and pours about 11 tons of billets every 24 hours.

It's a good example of the versatility and fast-melting characteristics of Detroit Rocking Electric Furnaces. Each heat produces a billet of precisely controlled analysis. Rocking action of the furnace makes most efficient use of the heat from the indirect arc, guarantees homogeneity of metal. High quality metal means fewer rejects, better products.

Detroit Electric Furnaces, in capacities from 10 to 8000 lbs., are outstanding producers for both ferrous and non-ferrous metals. Outline your requirements and we'll give you complete information to bring new efficiency to your metal melting. Write today!

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Speakers table at Northeastern Ohio Chapter's Old Timers meeting showing from left to right: Bud Heil, Dave Clark, Steve Kelly, new president of the chapter, and Frank Cech, retiring president.

Chapter News

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year are: Chairman, Bruce Harding; vice-chairman, Claridion J. Thomas; secretary-treasurer, Frederick J. Hodgson, and corresponding secretary, Thomas G. Thomas.

Chapter Elections

Birmingham District Chapter

Chairman: Biddle W. Worthington, *McWane Cast Iron Pipe Co.* Birmingham, Ala.

Vice-Chairman: Edwin E. Pollard, *Alabama Pipe Co.*, Anniston, Ala.

Secretary-Treasurer: John F. Drenning, *Kerchner, Marshall & Co.*, Birmingham, Ala.

British Columbia

Chairman: William Ralph Holeton, *University of British Columbia*, Vancouver, B. C., Canada.

Vice-Chairman: Howard H. Havies, *Vivian Diesels & Munitions, Ltd.*, Vancouver, B. C., Canada.

Secretary-Treasurer: David E. Wiseman, *Vancouver Iron Works, Ltd.*, Vancouver, B. C., Canada.

Central Illinois

Chairman: Henry Felten, *Peoria Malleable Castings Co.*, Peoria, Ill.

Vice-Chairman & Program Chairman: Burton L. Bevis, *Caterpillar Tractor Co.*, Peoria, Ill.

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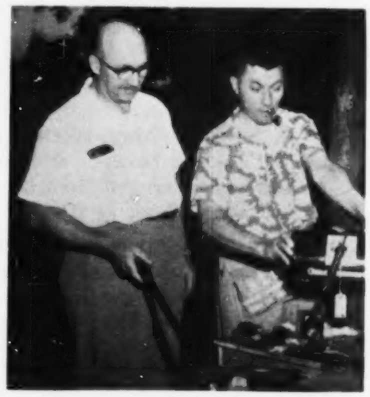

Henry Felten, Peoria Malleable Castings Co., Peoria, Ill., chairman, Central Illinois Chapter, left, and George Schuller, Caterpillar Tractor Co., Peoria, Ill., entertainment chairman, right, examine prizes at the 7th Annual Stag Picnic "Old Time Barbecue," held at 497th Engineers Club, Groveland, Ill.

Chapter News

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Secretary-Treasurer: John Hrvatin, *Caterpillar Tractor Co.*, Peoria, Ill.

Chesapeake Chapter

Chairman: Wm. H. Baer, *Bureau of Ships, Navy Dept.*, Washington, D.C.
Vice-Chairman: Michael J. Kelly, *Kelco Corp.*, Baltimore, Md.
Secretary: Lewis H. Gross, *American Radiator & Standard Sanitary Corp.*, Baltimore, Md.
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Asst. Program Chairman: Clayton D. Russell, *Phoenix Iron Works*, Oakland, Calif.
Secretary: Davis Taylor, *American Wheelabrator & Equip. Corp.*, San Carlos, Calif.

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Kenneth H. Priestley, right, Vassar Electroloy Products, Inc., presenting retiring pattern instructor George Posthumus with bronze book ends cast and finished in the Michigan State College foundry.

Group attending a recent Sand Control Conference held at Case Institute of Technology. *Photo courtesy of Thomas Gallagher, Lake City Malleable Co.*

Chapter News

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Treasurer: Fred A. Mainzer, *Pacific Brass Foundry of San Francisco,* San Francisco, Calif.

Northwestern Pennsylvania

Chairman: Charles F. Gottschalk, *Cascade Foundry Co.,* Erie, Pa.
Vice-Chairman: Bailey D. Herrington, *Hickman, Williams & Co.,* Erie, Pa.
Secretary: Jacob Diemert, *Erie Casting Co.,* Erie, Pa.
Treasurer: Clyde E. Cooper, *Keystone Brass Works,* Erie, Pa.

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Vice-Chairman: Fred J. Rutherford, *Refractories Engr. & Supplies, Ltd.,* Hamilton, Ont., Canada.
Secretary-Treasurer: Gerald L. White, *B. L. Smith Publishing Co.,* Toronto, Ont., Canada.

Quad City Chapter

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Vice-Chairman: William Ellison, *Thiem Products, Inc.,* Rock Island, Ill.
Secretary-Treasurer: Robert E. Miller, *John Deere Planters Works,* Moline, Ill.

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Chairman: Neal F. Clement, *Rochester-Erie Foundry Corp.,* Rochester, N. Y.
Vice-Chairman: Duncan M. Wilson, *American Brake Shoe Co.,* Rochester, N. Y.
Secretary-Treasurer: Charles D. Loomis, *General Railway Signal Works,* Rochester, N. Y.

Timberline Chapter

Chairman: Roger Hageboeck, *Electron Corp.,* Littleton, Colo.
Vice-Chairman: E. Byron McPherson, Jr., *McPherson Corp.,* Denver, Colo.
Secretary: Alfred W. Hall, *Hathaway Instrument Co.,* Denver, Colo.
Treasurer: Warren C. Prosser, *Consulting Engineer,* Denver, Colo.

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Also attending the Old Timers Meeting of the Northeastern Ohio Chapter were: Robby Robinson (left), Archer-Daniels-Midland Co., and Walton L. Woody, National Malleable & Steel Castings Co.

Chapter News

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Western New York

Chairman: Joseph M. Clifford, *Bison Castings, Inc.*, Buffalo, N. Y.
Vice-Chairman: William H. Oliver, *American Radiator & Standard Sanitary Corp.*, Buffalo, N. Y.
Secretary: A. J. Heysel, *E. J. Woodison Co.*, Buffalo, N. Y.
Treasurer: Martin W. Pohlman, *Pohlman Foundry Co., Inc.*, Buffalo, N. Y.

Wisconsin Chapter

Chairman: Albert F. Pfeiffer, *Allis Chalmers Mfg. Co.*, West Allis, Wis.
Vice-Chairman: Robert V. Osborne, *Lakeside Malleable Casting Co.*, Racine, Wis.
Secretary: Paul C. Fuerst, *Falk Corp.*, Milwaukee.
Treasurer: Leonard Gratz, *G & O Pattern Works*, Milwaukee.

Washington Chapter

Chairman: Wm. L. Mackey, *Washington Stove Works*, Everett, Wash.
Vice-Chairman: James N. Wessel, *Puget Sound Naval Shipyard*, Bremerton, Wash.
Program Chairman: William A. Shaug, *South Seattle Steel Foundry Co.*, Seattle.
Secretary: Fred R. Young, *E. A. Wilcox Co.*, Seattle.
Treasurer: Vernon W. Rowe, *Ballard Pattern & Brass Foundry*, Seattle.

Western Michigan Chapter

Chairman: Fred J. DeHudy, *Centrifugal Foundry Co.*, Muskegon, Mich.
Vice-Chairman: John A. VanHaver, *Sealed Power Corp.*, Muskegon.
Secretary: George W. Bartlett, *Lakey Foundry Corp.*, Muskegon, Mich.

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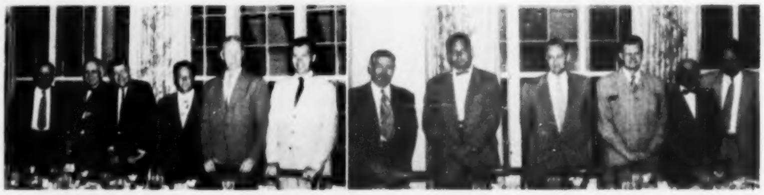
Chapter Photos

Robert Wolf (center), instructor in Metallurgy, Missouri School of Mines, thanks two well-known St. Louis District foundry supply men for their support of the foundry educational program at the school. At left, E. J. Aubuchon, M. A. Bell Co.; right, Webb L. Kammerer, Midvale Mining & Mfg. Co.



A group view of the speakers table at a recent New England Foundrymen's Association outing held just outside of Fitchburg, Mass. *Photos, courtesy of Charles E. Vautrain & Associates, Holyoke, Mass.*

Recently installed officers and directors of Western New York Chapter from left to right are: Frederick J. Goerke, Standard Buffalo Foundry, Inc., director; A. J. Heysel, E. J. Woodison Co., secretary; Joseph M. Clifford, Atlas Steel Castings Co., chairman; J. Edmund Burke, Hanna Furnace Co., director; William H. Oliver, Bond plant, American Radiator & Standard Sanitary Corp., vice-chairman; Edwin W. Deutschlander, Worthington Corp., past chairman; Martin W. Pohlman, Pohlman Foundry Co., treasurer, and William H. Taylor, Worthington Corp., custodian. *Photo, courtesy, A. J. Heysel, E. J. Woodison Co., Buffalo, N. Y.*

Chapter News

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Treasurer: John Byron Powers, *Campbell, Wyant & Cannon Foundry Co.*, Muskegon, Mich.

Philadelphia Chapter

Chairman: W. Donald Bryden, *Philadelphia Bronze and Brass Corp.*, Philadelphia.

Vice-Chairman: Daniel E. Best, *Bethlehem Steel Co.*, Bethlehem, Pa.

Secretary-Treasurer, W. B. Coleman, *W. B. Coleman & Co.*, Philadelphia.

Cincinnati District

Chairman: Wm. L. Oberhelman, *Oberhelman-Ritter Foundry Co.*, Cincinnati.

Vice-Chairman: Harry F. Greek, *Hill & Griffith Co.*, Cincinnati.

Secretary: John D. Sheley, *Black Clawson Co.*, Hamilton, Ohio.

Treasurer: Robert H. Ritter, *Oberhelman-Ritter Foundry Co.*, Cincinnati.

Assistant Treasurer: Robert C. Shick, *Ranson & Orr Co.*, Cincinnati.

Firm Acts To Ease Engineer Shortage

National Radiator Co., Johnstown, Pa., has initiated a program of aid to high school graduates in its area who wish to attend engineering colleges but lack the finances.

Two June graduates from Johnstown area schools have been selected to receive the first scholarships. Now at work in National's research laboratory, they will begin their engineering studies in September. The company will pay all tuition costs for the four years, and will buy all necessary books and pay all laboratory fees. The living expenses will also be financed by the organization.

During the summer, the engineering students will return to the National Radiator research laboratory for practical training. Upon graduation, they will be offered employment in the engineering, manufacturing or sales departments of the firm.

Selected students must have high scholastic records and show good extracurricular activity. They must be primarily interested in studying engineering and must have no other means of financing their education.

Obituaries

Ernest Lewis Waterhouse, resident manager of Eaton Manufacturing Co., Foundry Division, Vassar, Mich., died June 26. A veteran of almost 32 years in the foundry industry, Mr. Waterhouse began his career in September, 1921, with Holley Carburetor Co. in Detroit. The firm moved to Vassar in February, 1932, where it ultimately became part of the Eaton Manufacturing permanent mold gray iron foundry. Mr. Waterhouse was a member of the American Foundrymen's Society.

ERNEST LEWIS WATERHOUSE

Clare W. Dock, 60, Dock Foundry Company, Three Rivers, Mich., died June 20, 1953, at the Three Rivers Michigan Hospital. Mr. Dock, a member of AFS, worked at Fairbanks Morse Co. for several years prior to the opening of the Dock Foundry Company in 1930.

David J. Vail, 52, vice-president in charge of sales, Campbell, Wyant and Cannon Foundry Co., died of a heart attack recently. He was associated in a supervisory capacity with Continental Motors Corp. until 1930, when he joined Campbell, Wyant and Cannon as an experimental engineer in camshaft production and other foundry processes.

In conjunction with the late Donald J. Campbell he was instrumental in developing a cast camshaft, a revolutionary advance in the automotive industry.

Chapter Outings

August

8 . . Canton
Alliance Country Club, Alliance, Ohio, Annual Picnic.

8 . . Chicago
Lincolnshire Country Club, Crete, Ill., Annual Stag Outing and Golf.

15 . . Western Michigan
Pontaluna Golf Club, Annual Stag Picnic.

September

25-26 . . Eastern Canada
Admiral Beatty Hotel, St. John, N. B. Canada, Maritimes Meeting.

Australian Foundrymen Announce Convention

The Institute of Australian Foundrymen (N.S.W. Division) has scheduled an exhibition to be held in conjunction with the annual convention during the week of August 30-September 5, 1953.

The Exhibition is the first to be staged by the Institute, and is thought to be the first of its kind ever held in Australia. Space has been secured in the Sydney Town Hall for the exhibits, which will be in three principal categories: castings which illustrate one or more superior qualities, mechanical aids, new machines, raw materials, and other products to improve casting processes; and testing equipment and other devices used for research, development, and quality control.

An official brochure will be made available to those interested in using the exhibition facilities.

The Convention

The convention itself will cover recent development in ferrous, non-ferrous, and light alloys fields. Papers will be pre-printed and distributed before the sessions. A program of social events is being planned for the ladies and families of foundrymen attending the convention. The official AFS exchange paper will be prepared by J. B. Stazinski, General Electric Co., Lynn, Mass., on the subject of shell molding.

The Proceedings of the 1952 meeting of the N.S.W. Division of the Institute have recently been published in pamphlet form, which is available upon application. The publication includes all of the technical papers presented at the 1952 convention.

Index to Advertisers

AFS Publications

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CONSULTING AND SERVICE METALLURGIST with technical background and malleable foundry experience. Sales inclination desirable and be prepared to travel. Write giving full information and salary expected. **Box A21, AMERICAN FOUNDRYMAN, 616 S. Michigan Ave., Chicago 5, Ill.**

OPEN HEARTH MELTER experienced in basic steel foundry practice. In replying give complete information which will be held in strict confidence by a single executive. Address: **Box A14, AMERICAN FOUNDRYMAN, 616 S. Michigan Ave., Chicago 5, Ill.**

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SALES REPRESENTATIVE — Advertisement above also for Virginia, North and South Carolina. **Box A22, AMERICAN FOUNDRYMAN, 616 S. Michigan Ave., Chicago 5, Ill.**

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JOURNALS wanted to buy for cash. Back volumes and sets of the Society Transactions and other scientific and technical periodicals. **ASHLEY, 24 East 21st St., New York 10, N. Y.**

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FOR SALE: 1—66" Dia. Table, Cabinet Type, American Wheelabrator complete with dust collecting equipment, purchased new July, 1943. Used very little. May be seen in operation. OTTUMWA BRIDGE & CONSTRUCTION CO., P. O. Box 463, Ottumwa, Iowa.

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Alloy Cast Irons Handbook (2nd Edition)	1	$2.75	$4.50
Analysis of Casting Defects	3	2.50	4.25
Copper-Base Alloys Foundry Practice	57	3.75	5.75
Cupola Operations Handbook	7	6.00	10.00
Development of Metal Castings Industry	8	3.00	6.00
Foundry Core Practice (2nd Edition)	38	6.50	10.00
Foundry Sand Handbook (6th Edition)	12	3.50	5.25
Foundry Work	50	1.76	1.76
Patternmaker's Manual	61	4.50	6.75
Recommended Practices for Sand Casting Aluminum & Magnesium Alloys	24	1.00	1.75
Symposia			
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